



A VERMONT FARM HOME.

VERMONT FARMS

Some Facts and Figures Concerning the
Agricultural Resources and Opportun-
ities of the Green Mountain State



Issued by THE VERMONT BUREAU OF PUBLICITY

OFFICE OF SECRETARY OF STATE

ESSEX JUNCTION, VERMONT

Vt Coll.

ABA 080

S

451

.V5

V472

1916



Vermont as a Farming State.

Surpassed by no state last year in bushels of corn per acre, surpassed by only one state in bushels of spring wheat per acre, by only one state in bushels of rye per acre, by only one state in bushels of potatoes per acre, by only three states in pounds of tobacco per acre, by only four states in bushels of oats per acre, and by only six states in bushels of barley per acre, Vermont's agricultural record for the season of 1914 is one of which any state might well be proud. Taking area and population into account, no other state approaches Vermont in its output of dairy products.

Last year (1914) the average returns per acre for nine staple crops grown in Vermont amounted to \$61.458. The average returns per acre for staple crops for the entire United States amounted last year to \$27.005, or an average for Vermont of nearly two and one-half times the average returns for the nation.

When the facts concerning Vermont agriculture, based on United States government reports, are known, very many persons are likely to gain a new idea of the resources and opportunities of this state. Vermont's handicap has been that these significant facts were not generally known. The purpose of this book is to aid in placing before the people of this country the great things that Vermont farmers have accomplished, and the vastly greater results that may be achieved on the farms of the Green Mountain state.

The people of Vermont have been over modest in their failure to do a little wholesome boasting concerning the natural advantages with which a generous Creator has endowed them. Perhaps the people of Vermont themselves not always have appreciated the value of their agricultural assets. Not long ago the editor of the Rural New Yorker, in the columns of the well-known journal which he edits, said, under the caption, "The Bashful State": "One would hardly claim at first thought that such a title could be made to fit New England. The Yankees are not supposed to be lacking in assurance, yet when it comes to trying to hide opportunities under a bushel Vermont can take the front seat. It is doubtful if in any state of the Union there is less poverty, discontent or hunger than in Vermont. With a population of some 350,000 there are home opportunities for three times as many. Remember that in New York City alone there are 900,000 Russian Jews—with both parents born in Europe. Vermont is covered with opportunities in dairying,

general farming, gardening and apple culture. These opportunities are known and recognized, yet they have never been fairly put before the people. That is why the state may be called 'bashful'. The Rural New Yorker believes it will be to the advantage not only of Vermont but the rest of the country as well to tell something about the state."

Reference then is made to opportunities for successful apple growing, from which extracts will be made elsewhere in this book. The editorial closes with the following paragraph: "The history of Vermont is full of 'ifs'. For instance, if the money earned in the state and sent to develop the West had been kept at home to build roads and develop forests and farms. Or if at the time Oregon and Washington began to develop this apple business, Vermont had done the same, and stuck to it with equal energy. You see we are right in calling Vermont 'bashful' she hardly recognizes her own good things. We shall see that the world knows some of them at least."

This book is submitted as evidence that Vermont is outgrowing the "bashful" stage of existence, and desires to have the world know and appreciate her splendid possibilities. More than that, it may be considered a hearty invitation to come and join the good people of Vermont in developing the magnificent natural resources herein described.

What inducements can Vermont offer an ambitious, wide-awake farmer to settle in the Green Mountain state? That is a fair question, and demands an equally fair answer. Any satisfactory answer must include information regarding agricultural resources, opportunities and profits. An impression has been created, and has been accepted in very many quarters as a fact, to the effect that upon the broad prairies of the West is the place of all others where money may be made in farming, but impressions often are misleading, and sometimes are incorrect. This little book will undertake to show, not by empty boasts and rhetorical statements, but by well authenticated facts and figures, that the state of Vermont offers opportunities for profitable farming equal to all and superior to most of the states of the Union.

But somebody will say that Vermont is a little state, consisting mostly of mountains, that her soil is rocky and sterile, and that it is ridiculous to claim that this little commonwealth can be compared with the great states of the Middle West as a profitable farming region. It is true that Vermont is a mountainous state, and her people are proud of the fact. Her mountains are a source of strength and beauty, but they are useful as well as beautiful. They condense the moisture that the clouds bear inland from the Atlantic ocean and make possible the abundant verdure which has given to these lofty hills their familiar and appropriate name, the Green mountains. They furnish ex-

cellent timber, and the hill country affords that wonderful pasture land which has put Vermont in the lead of all other commonwealths as a dairy state, taking area and population into account. Nothing could be farther from the truth, however, than the idea that Vermont contains only small and undesirable farms, or that the soil of the state is sterile, and that this is an unprofitable agricultural region.

Theodore N. Vail today is one of America's great captains of industry. Probably no great industrial leader of modern times has exceeded Mr. Vail in a keen comprehension of the statesmanship of business. This is what he says of Vermont in an article printed in a magazine: "Agriculture, including all its branches, is its (Vermont's) greatest asset and in this is the greatest industrial possibility. The backbone of Vermont's future will be its agricultural resources, and will be the source from which the wealth and comfort of its people will be largely drawn. The cheap competition of the West is past. Production of grain, meats, all that land produces, will never again be met with that competition from the great farms of the West, where crops were raised almost without labor and where all were producers. Eastern prices for all that Vermont can raise and produce will always be remunerative for those who produce intelligently. Thrift and industry directed by intelligence will always be prosperous in Vermont. With a little painstaking instruction Vermont boys can be taught how to make the hillside and valley homes more desirable than any they can find by wandering.

"Vermont dairy products are the standard. Vermont beef could not be surpassed in the days when every farm had, and will have again, those big steers and oxen. Vermont mutton is not excelled in the world. Vermont fruit, particularly its apples, are inferior to none when given proper attention. Vermont horses are the best foundation stock from which to breed such horses as are now necessary to meet the market requirements."

The late Maxwell Evarts, one of the prominent lawyers of this country, said of Vermont that "alone of all New England she had withstood the agricultural competition of the West. This competition is now ended and Vermont is coming forward with great strides to her old place of a leader among the farming states."

Both Mr. Vail and Mr. Evarts demonstrated their faith in Vermont by establishing their homes and cultivating farms in the Green Mountain state.

Prof. E. H. Farrington, head of the department of dairy husbandry in the University of Wisconsin, visited Vermont not long ago, and declared as a result of his visit that Vermont is a much misunderstood state. He had no idea there was so much fertile land here and he said the people of the West have the same mis-

taken opinion of the size of our farms. He expressed the belief that Vermont was one of the best parts of the country in which a man might engage in farming, mentioning the cheapness of the land and the nearness to markets as important inducements. He found our farms prosperous and the average farm homes better even than those in the West.

Professor Farrington's idea that there are no big farms in Vermont was dispelled by a visit to various parts of the state. To those who have not seen our broad and fertile farms, and who hold the same erroneous opinion, it may be well to call attention to the last census report, which shows the size of the average farm in the United States to be 138.1 acres, and the size of the average Vermont farm to be 142.6 acres. The size of the average farms in the states of the Central West are as follows: Ohio, 88.6 acres; Indiana, 98.8 acres; Illinois, 129.1 acres; Michigan, 91.5 acres; Wisconsin, 118.9 acres; Minnesota, 177.3 acres; Iowa, 156.3; acres. Only two of these states surpassed Vermont in the size of the average farm.

A FEW FERTILITY FACTS.

Those persons who have considered Vermont soil barren will do well to consider the following facts compiled from the United States census and crop reports:

Last year* no state raised more bushels of corn per acre than Vermont, and only one state raised as much. The average price in Vermont paid farmers December first was 81 cents, while the average price paid throughout the United States was 63.7 cents. For the forty-year period from 1870 to 1909, inclusive, Vermont ranks first in average yield of bushels of corn per acre.

Last year only one state, and that in the irrigated region of the West, raised more bushels of spring wheat per acre than Vermont. The average Vermont yield last year was nearly two and one-half times that of the United States. The average price paid in Vermont during the last few years generally has been more than 20 cents per bushel greater than that reported for the entire United States. During the period from 1870 to 1909, inclusive, only two states, and those in the irrigated regions of the West, surpassed Vermont in the average yield of bushels of wheat per acre.

Last year only four states raised more bushels of oats per acre than Vermont, and this state led all the big oat-

*Last year, as used in this book, applies to 1914, the figures for 1915 not being available when the text was written. These figures are being compiled and will be furnished to any person making application for them.

producing states in average yield and price. Vermont's average for the past year was nearly 25 percent greater than that of the United States. For the forty-year period from 1870 to 1909, Vermont led the Union in the average yield of bushels of oats per acre.

Last year only six states raised more bushels of barley per acre than Vermont. The average Vermont price last year was 38 per cent greater than the average price in the United States. During the period from 1870 to 1909, only four states exceeded Vermont's average yield per acre.

Last year only one state raised more bushels of rye per acre than Vermont, two having the same average, but Vermont led most of the great rye-producing states in yield per acre and price. During the forty years from 1870 to 1909, only five states raised more bushels of rye per acre than Vermont.

Last year only one state led Vermont in the yield of bushels of buckwheat per acre. During the last few years Vermont has led the great buckwheat growing states in average yield and price. During the forty-year period from 1870 to 1909, only one state showed a better average yield than Vermont.

Last year only one state, and that state, Maine, raised more bushels of potatoes per acre than Vermont. Vermont's average for last year exceeded the average yield for the United States by 58.5 bushels per acre. For the period from 1870 to 1909, only two states showed a larger average yield than Vermont.

Last year only three states surpassed Vermont in yield of pounds of tobacco per acre and those three were New England states. During the past few years Vermont's average yield and price has been almost twice the United States' average reported.

For the forty-year period, 1870 to 1909, Vermont led the Union in average returns per acre for the three most important cereals, corn, wheat and oats.

Considering area and population, Vermont is by far the most notable dairy state in the Union, being really in a class by itself. In per capita value of specified dairy products returned by farmers in 1909, including milk, cream, butter fat, butter and cheese, Vermont's per capita was more than six times that of the United States. Only one state showed a per capita valuation one-half as large; only two states, one-third as large; only four states, one-fourth as large. Vermont produces more pounds of butter per capita than any other state. Only three states produce one-half as much, only six states, one-third as much, and only eight states, one-fourth as much. Vermont

leads all other states in pounds of butter per farm. Only four states produce one-half as much, only nine states, one-third as much, only sixteen states, one-fourth as much. Vermont leads the Union in production of pounds of butter per cow. Vermont leads the Union in ratio of dairy cows to population. In pounds of butter per square mile, Vermont is far in the lead of any other state. In dairy cows per square mile, only one state leads Vermont, and in all cattle per square mile, only two states lead Vermont.

In value of all crops per capita of rural population, according to the last census figures compiled, only ten states surpassed Vermont. In value per acre of all cereals produced in 1909, only seven states surpassed Vermont.

These matters will be taken up later in greater detail, but the facts mentioned are sufficient to show that instead of being a sterile region Vermont is one of the most fertile regions to be found in the entire United States. Proximity to the great cities of the nation, the best markets in the world, is an asset of great value to Vermont. The state is not dependent upon a single railroad, but it is served by some of the most important railroad systems of the country, and the Champlain valley has the added benefit of water transportation to the seaboard.

Professor Farrington was correct in asserting that the cheapness of land was one of the attractions which Vermont agriculture offered to a person seeking a good farm investment. There are several reasons why Vermont farms are quoted so much lower per acre in the census returns than the lands of the prairie states. Many Vermont farms contain a considerable forest area, and pasture land too rough for tillage. The forests not only furnish timber but often contain good maple sugar orchards. The sweet, verdant pastures make possible the high rank which Vermont holds as a dairy state, but these lands are not appraised as high as fields that may be tilled.

From the beginning Vermonters have been pioneers. Every state west of Lake Champlain has received a goodly number of citizens from the Green Mountain state, who have been attracted by the opening of a new region. The lure of the city has been a strong attraction for many, with tales of great fortunes to be won. Now, the tide has turned. Prices of agricultural products are materially higher than they were twenty or thirty years ago. Farmers are learning to till the soil more intensively and more scientifically. Prices of Vermont farms are rising and will continue to rise in all probability, for they are altogether too low, judged by what these farms produce and by the still greater amount that they may be made to produce. Persons desiring to take advantage of the low prices of Vermont farms should not

delay in securing an option, as prices must continue to advance, according to all generally accepted financial rules.

BACK TO THE EAST.

More and more the attention of seekers for agricultural opportunities is being turned back to the East as a region offering on the whole more than any other section of the country to the farmer who has ambition and energy, but not the capital sufficient to pay fancy prices for land. Not only are prices for farm lands in the Central West so high that it is difficult for a young man to purchase a homestead in that section, but it is reported also that these fertile prairies are showing signs of exhausted fertility.

In respect to all the fundamental requirements of soil, markets and prices, Vermont has so much to offer that no farmer seeking the most and the best for his money can afford to ignore them. Vermont is one of the best states in the Union in which to establish a home. The home surroundings and advantages constitute a most important factor and one that cannot easily be estimated in dollars and cents. Vermont has good schools, good churches, good roads, a healthful climate, a large mileage of telephone lines, extensive rural free delivery of mails, a large number of Grange organizations, delightful scenery, and all those things that make every day life pleasant and desirable.

FACTS FROM THE CENSUS.

A few preliminary facts may be considered profitably before a more detailed description of Vermont's agricultural advantages is given. Vermont's area is 9,564 square miles. The population of the state, as reported by the census of 1910, was 355,956. Vermont ranked forty-second among the states of the Union in area and population.

The percentage of the land area of Vermont in farms is 79.9.

The rural population of Vermont is 52 per cent of the total population.

The number of farms in Vermont in 1910 was 32,709.

The average value of farm property in Vermont in 1910 was \$4,445.

The average number of acres in a Vermont farm in 1910 was 142.6.

The approximate land area of the state is 5,839,360 acres, and of this area 4,663,577 acres are in farms.

The amount of improved land in farms is 1,633,965 acres.

The value of all farm property in Vermont in 1910 was \$145,399,728.

The average value of farm lands per acre for the whole state was \$12.52.

Only nine states exceeded Vermont in average value of farm buildings, Vermont's average valuation being \$1,657, compared with an average valuation of \$994 for the United States.

Vermont ranks seventeenth in average value of farm implements and machinery, Vermont's average being \$311 compared with an average of \$199 for the United States.

The census of 1910 showed that there were 49,599 persons in Vermont engaged in agriculture, forestry and animal husbandry, or 34.4 per cent of the number of persons ten years or over engaged in gainful occupations, this percentage being larger than that of any other occupation in the state. The total number of farmers and farm laborers was 47,818.

The value of all crops in Vermont in 1909 was \$27,446,836.

The total value of farm property in Vermont increased during the last census decade 34.1 per cent.

The value of all crops in Vermont increased during the last decade 51 per cent.

The average value of Vermont farm land per acre increased during the past decade 29.1 per cent.

The value of Vermont livestock on farms in 1910 was \$22,642,766 representing an increase of 26.9 per cent during the decade.

In 1910 Vermont had 430,314 cattle on farms, or nearly one-third of all the cattle in New England.

In 1910 Vermont had 265,483 dairy cows, being surpassed by twenty-five states in number of cows and by fourteen states in value of all dairy products.

In 1910 Vermont had 80,781 horses valued at \$8,591,357.

In 1910 Vermont had 94,821 swine, valued at \$974,779.

In 1910 Vermont had 118,551 sheep, valued at \$538,991.

In 1910 Vermont had 938,524 fowls, valued at \$607,787.

In 1910 Vermont had 10,215 colonies of bees, valued at \$44,349.

The following statement regarding Vermont soils has been prepared for this book by Prof. J. L. Hills, Dean of the College of Agriculture of the University of Vermont.

CONCERNING VERMONT SOILS.

"The phrases 'Vermont agriculture' and 'abandoned farms' spell the same thing to many people. Newspapers outside the state are apt to refer to Vermont's farming operations in dismal terms. Such treatment is unjust, for the present outlook is encouraging and the future prospects bright. Few farms are abandoned save in those localities where modern farming operations, are, as the physician would say, counter-indicated. The reversion of some Vermont farms of two generations ago to forest conditions is a cause for congratulation, and not for condolence.



A VERMONT FARM BARN.



READY FOR THE PLOW.

They never were meant by the Almighty to be farms, and the men who wrested them originally from the forests were working against His plans. In the valleys and on the lower hill slopes, agriculture may be, and is being, conducted successfully and profitably. On such areas, Vermont soil is not exhausted, though it may be temporarily weary.

"Vermont soil is inherently fertile. The detritus of the granitic rocks of the Green Mountain range, ground in the mighty mills of the old time glacier, sorted by the rushing waters which followed its melting, commingled with the debris of thousands of years of unharvested vegetation, worked over by heat and by cold, by wind and by wave, by water and by ice, by frost and by snow, by flood and by rain, and by the multitudinous effects of the weather throughout the ages past, it has made of this fair state a more fertile land than some of her less favored sisters. Not for naught are our mountains verdure clad. Not idly, not without a reason, is Vermont called the Green Mountain state in contradistinction to her eastern neighbor, the Granite state. Alone among the states, save Florida, her very name bespeaks fertility. Vermont means 'green mountain,' and her mountains are 'verdure clad hillsides', because the soil upon them is naturally fertile.

"Not only did nature endow her richly in this respect, but her bounty has not been as prodigally wasted as in some other sections. This statement is made advisedly, and has this firm basis in reason; that for generations Vermont has been a dairy state, a buttermaking section. In no other state in the Union are there so many cows crowded upon so small an arable area. She far out-classes all her sisters in this respect. As a natural correlary of this condition several things follow, namely:

(1) Her crops are fed at home and not removed from the farm or the locality, and this to larger extent than obtains anywhere else in our broad land.

(2) Large grain purchases naturally are made in order to maintain the evenness of the milk flow.

(3) Butter sales remove but a minute fertility from the farm, a ton carrying barely 50 cents' worth.

"All this means that Vermont farmers have for generations kept their fertility upon their own farms, and sold but little of it. The cotton farmer and the grain farmer sell the very essence of their real estate. The man who sells butter, however, sells elements gathered from the air and not from the soil. It furthermore means that for two generations these thrifty Vermonters have translocated fertility in the shape of cottonseed meal from the South and wheat bran, middlings and mixed feed from the West, to place upon their Vermont fields in the form of manure. Naturally fertile, the methods of Vermont farming have tended to increase and not to decrease the plant food contents of her

soils, and large areas are, as a consequence, richer today even than they were at the outset.

"Vermont's topography is irregular. Barely one-third of her entire land area is made up of pasture (of the better sort), of mowings and of plowed fields; nearly two-thirds of her area is occupied by woodlots, forest areas, and rough lands. Such as is good is good; such as is not adapted to agricultural purposes is largely covered by forests, is being set out to forests, or is reverting to forests. The proportion of improved lands, however, notwithstanding topographical irregularities, is decidedly greater than is found in either Maine or New Hampshire; somewhat greater than is found in Massachusetts or Rhode Island; and is essentially the same as that occurring in Connecticut.

"No systematic soil survey has been made in Vermont save one carried out some fifteen years ago by the Bureau of Soils of the United States Department of Agriculture, which mapped out an area of the lake towns in Addison county from Ferrisburgh to Orwell, stretching back about ten miles from Lake Champlain. This area includes perhaps the largest area of soils of relatively even character; and yet it covered in all but a little more than two per cent of the entire area of the state. It established nine distinct soil types, the most important being a clay and two sandy loams. Hay was found to be the most important crop grown on the heavier soil. It grew at the rate of approximately a ton to the acre, but the survey developed the fact that—when properly handled—it was capable of growing easily two or more tons to the acre. This soil makes an excellent pasture soil, but is ill adapted to the growth of corn. The stony loams were found to be well-fitted to apple orcharding, and to some extent to be thus used. They do not lend themselves well to the growth of corn or hay and are largely occupied by pasture or woodlot, save where orcharding obtains.* A similar survey covering most or all of Windsor county was begun in 1915, and will be completed in 1916, the results of which should be available in a few months.

"The alluvial and bench lands of the river beds, the valley soils in general, are fertile; and these valleys ramify in all directions. Vermont is full of valleys. It has been said that while the Almighty can do anything, there is one thing which even He cannot do, and that is to make two ranges of mountains without a valley in between. Considerable upland soil in Vermont is of a strong character, and, if not acid, produces well. If it is found to be acid, liming tends to remedy the situation."

*See 6th Report, Bureau of Soils U. S. D. A. (1904).

AGRICULTURAL ADVISERS.

Ten Vermont counties—Addison, Bennington, Caledonia, Chittenden, Franklin, Orange, Orleans, Rutland, Windham and Windsor—are now supplied with county agricultural agents; and Washington county will be thus supplied on July 1, 1916, making eleven of the fourteen counties thus manned. The University of Vermont trustees by vote have committed that institution to the policy of placing county agents in the other three counties as rapidly as they qualify by forming county agricultural associations.

The county agents are supported cooperatively by the Federal Department of Agriculture, the College of Agriculture of the University of Vermont and local county farmer associations. Their functions are purely educational. They look upon the men and women of the farm, as well as the boys and girls, as students; and they use, not only the class room but the barn, the field, the creamery or the home, for demonstration purposes. They are at the service of Vermont farmers, actual or prospective, in their respective counties, going on call and without charge to advise them as to their farming operations. It goes without saying that the longer the local agent resides in the county and gains local experience, the better fitted is he to offer wise counsel. Prospective settlers in Vermont may well take into account this important factor which tends to increase the likelihood of success.

The names and addresses of the county agents are as follows: Addison county, J. E. Carrigan, Middlebury; Bennington county, ——— Manchester Center; Caledonia county, L. A. Wood, St. Johnsbury; Chittenden county, J. W. Dana, Burlington; Franklin county, G. U. Tiffany, St. Albans; Orange county, E. H. Loveland, Randolph; Orleans county, R. E. Deuel, Newport; Rutland county, M. F. Downing, Rutland; Windham county, A. W. Sweeton, Brattleboro; Windsor county, J. C. Otis, White River Junction.

As an illustration of the work that is being done by the county agents throughout the state the following statement prepared by Mr. Sweeton the Windham county agent, for this book, on the agricultural resources and opportunities of Windham county is given herewith:

AGRICULTURAL RESOURCES AND OPPORTUNITIES OF WINDHAM COUNTY.

“Windham county is situated in the southeast corner of the state. Part of the county along the Connecticut river resembles Massachusetts conditions with the light sandy loam soils and the broad level fields. Irregular ranges of hills run north and south and grow higher toward the western side. Through this

hilly section there are many fine farms with plenty of pasture and timber and usually with a good sugar orchard. The picturesque Deerfield valley running up into Wilmington broadens out and forms the center of quite a good farming section. Windham county has good roads, the ones along the Connecticut and West rivers being especially good. Roads leading to Marlboro, Dover, Wardsboro and other hill towns are very good and many automobile trips are taken over them every year.

"General crops are grown throughout the county, which is well adapted to dairying, combined with one or two money crops. Corn grows well in almost all parts of the county. Good crops of hay are secured and most of the land of Wilmington, Windham and Londonderry gives fine yields. Apples do well on the hills, which also are noted for maple products. Sweet corn, tobacco and onions are special crops which are grown in the Connecticut valley. Clover does fairly well where lime or ashes have been used to neutralize soil acidity. Most soils are acid and need lime for this crop. Crushed limestone is being used in large quantities, being purchased for about \$4.00 per ton, delivered in paper bags.

"The two local markets of Brattleboro and Bellows Falls take quantities of farm products and frequently they have to send away for such products as cabbage, carrots, asparagus, etc. Good train connections to Springfield, Fitchburg, Boston and other cities give an opportunity to dispose of surplus products. Buyers come in for some of the apples. They would come more if they could find more well-cared-for fruit. This crop is becoming our best money crop on the hill farms. Halifax and Whitingham already are noted for their fine apples. Brattleboro, Dummerston, Putney, Westminster, Rockingham, and Grafton also are good apple sections waiting for the right pruning, spraying and fertilizing. Greenings, Blessings, Wealthy and McIntosh do well. Baldwin does well except on the higher hills.

"Our hill farms are adapted to potatoes, which fit in well as a cash crop. A large local demand is supplied and sometimes potatoes are shipped out. In the town of Windham the farmers have organized a potato growers' association for the purpose of buying fertilizer and selling potatoes to better advantage. Farmers in Windham, Wilmington and Marlboro are making some plans toward the raising of seed potatoes for Southern growers. This line offers good opportunities for a group of farmers who will stick to it and work up a reputation. In the Massachusetts cities large amounts of potatoes are purchased for table stock.

"Maple sugar and syrup make a very important money crop on many farms. A large amount of fine sugar and syrup from this county finds its way to special customers who pay fancy

prices. More advertising and personal soliciting should find openings for more of this product.

"There are six creameries located in the towns of Newfane, Townshend, Londonderry, Jacksonville and Wilmington. Cream is delivered at these creameries and the farmer receives all there is in it, less the cost of making and marketing. The Amherst creamery runs a route in Vernon. Quantities of milk are loaded in the cars for Alden Bros. and Ida Graustein of Boston. A few farmers sell their cream to retail dealers in Holyoke and other Massachusetts cities and receive a very good price.

"In our local markets there are opportunities to sell all the beef, lambs, and pork that we can produce. Thousands of dollars are sent out of the county for these products every year. Quantities of corn, oats, wheat and hay are shipped in every year. There is no doubt that some persons could find it profitable to raise those products here at home.

"Three years ago the Windham Agricultural Association was organized with a large membership of farmers and business men. They employed a county agent who has been working ever since. Several cow testing associations have been formed. The Windham Potato Growers' Association has been organized. Farmers in the association have ordered lime and chemicals in car lots. Many more farmers are mixing their own chemicals at home. The efforts of the association have helped to reduce the delivered price of raw ground limestone about 40 per cent. A lime requirement soil survey has been taken, and numerous meetings and demonstrations have been held. Many other lines have been taken up and the county association promises to help the agricultural conditions considerably.

"The roads are good, the soil is good, and the climate is good. Our local markets and the Massachusetts cities are waiting for us, and an active man with business ability and some capital to do business with, should not fail to make a good living and good wages on a Windham county farm."

STATE COMMISSIONER OF AGRICULTURE.

The duties of the State Commissioner of Agriculture are many. The suppression of San Jose scale, gypsy and browntail moths is carried on under his supervision. While Vermont is not so badly infested as southern New England and some other sections of the country, vigilance is necessary to keep them from spreading. Three apiary inspectors are employed to control certain infectious bee diseases. An inspector of nursery stock also is employed to protect the fruit growing industry against infestation.

Creamery inspection, dealing with the cleanliness and accuracy of the work of these important adjuncts to dairying, is

a feature of his work. A dairy manufacturing specialist has been detailed by the dairy division of the United States Department of Agriculture for work in Vermont in cooperation with the commissioner. The commissioner has been actively interested of late in presenting before the Interstate Commerce Commission the cause of Vermont milk shippers relative to transportation rates.

The department issues practical bulletins from time to time, some of the more recent publications being: "Marketing Farm Products"; "Powdery Scab—a New Potato Disease"; "Care of Cream on the Farm"; and "How Maple Sugar is Made". Farmers' institutes are held in various parts of the state.

The cow testing association movement is guided by the commissioner. Vermont is the leading state of the Union in respect to the number of these associations, there being 40 of them in operation at the beginning of the year 1916 and several more in process of formation.

A Live Stock Commissioner performs duties of much benefit to the agricultural interests of the state.

DAIRYING.

Dairying constitutes one of the principal features of Vermont agriculture. Briefly stated, the census figures show that in 1909 Vermont produced on farms and in factories 35,393,187 pounds of butter, and 3,008,540 pounds of cheese. In addition to this amount 13,342,666 pounds of condensed milk were manufactured. The value of all Vermont's dairy products in 1909 is given by the census as \$12,128,465.

There were 15,165,692 pounds of butter made on farms, and 20,227,495 pounds of butter made in factories. There were 245,884 pounds of cheese made on farms, and 2,762,656 pounds of cheese made in factories. In the manufacture of butter, cheese and condensed milk in factories in 1909, Vermont ranked ninth in number and tenth in value of products. In 1909 Vermont ranked seventeenth in aggregate amount of butter made on farms and in factories and ninth in the aggregate amount of cheese made on farms and in factories.

Although Vermont is only a little state, having an area of less than ten thousand square miles, it outranks in its aggregate amount of dairy products many states much larger. When its comparative size is taken into account, it easily leads the Union, as tables compiled from census reports and embodied in this article will show.

The figures of the last census give the information that in 1909 Vermont reported a sale of 12,892,124 pounds of butter, and 7,756,345 pounds of butter fat. The sale of butter, butter fat and cheese as given in the census figures, applies only to sales

made by farmers, no figures being given for factories. This will explain what may appear to be a discrepancy in census figures. The value of butter fat produced in Vermont exceeded the value of the butter fat produced by all the other New England States combined, and Vermont's butter and butter fat amounted to 87 per cent of the butter and butter fat produced by all the rest of New England. Ten states surpassed Vermont in total number of pounds of butter sold by farmers; eight states, in total number of pounds of butter fat sold; seven states in pounds of cheese made by farmers; twelve states in gallons of milk sold by farmers; six states in gallons of cream sold by farmers.

Including sales of dairy products by creameries, factories and farmers, eleven states exceed Vermont in the aggregate receipts from dairy products; ten states exceed Vermont in pounds of butter sold; eight states exceed Vermont in pounds of butter fat sold; six states exceed Vermont in pounds of cheese sold; five states exceed Vermont in gallons of cream sold.

The average price per pound for butter fat in the United States in 1909 was \$0.26; Vermont's average in 1909 was \$0.29. The average price per pound of butter sold in the United States in 1909 was \$0.24; Vermont's average was \$0.27.

In the value of all dairy products sold by the farmers of the United States in 1909, including butter, butter fat, cheese, milk and cream, only one state showed a per capita value half as large as that of Vermont; only two states a per capita value one-third as large; only four states a per capita value one-fourth as large. Vermont's per capita value was more than six times the per capita value for the United States.

In the production of pounds of butter per capita, only three states report half as much as Vermont; only six states one-third as much; only eight states one-fourth as much. In pounds of butter per farm, only four states produced half as much as Vermont; only nine states one-third as much; only sixteen states one-fourth as much. In value of dairy cows per capita, only seven states showed a valuation one-half as great as Vermont; and only fifteen states a valuation one-third as great as Vermont.

The census figures also showed that Vermont had 1.23 per cent of the dairy cows of the United States, and that their valuation was 1.34 per cent of the total valuation of the dairy herds of the country. Vermont's population in the year 1910 was only .38 of 1 per cent of the total population of the United States. Vermont's percentage of the butter made in the United States in 1909 was 2.18 per cent and the state's percentage of the total value of the receipts of dairy products in the entire country for the same year, was 2.42.

A recent bulletin of the United States Department of Agriculture shows that on Jan. 1, 1915 there were in Vermont 268,000 milch cows with an average valuation of \$52 per head, which

represents a total valuation of \$13,936,000. The same report shows 165,000 other cattle, valued at \$3,857,000, making a total valuation of \$17,793,700 for all Vermont cattle. This state easily leads all the New England states in milch cows and other cattle and ranks twenty-sixth among the states of the Union in number of milch cows. The average price paid Vermont farmers for butter in 1914 was 31½ cents per pound.

The headquarters of two of the great dairy organizations of the country, the Holstein-Friesian Association and the Ayrshire Breeders' Association are located in Vermont, the former at Brattleboro and the latter at Brandon, and a recent president of the American Jersey Cattle Club was a Vermonter, Elmer A. Darling of Burke.

Vermont stands at the head of the list in number of cow testing associations, with forty such associations. When the unprofitable cows are eliminated from our herds it will be possible for Vermont to make a showing much better even than the excellent record just quoted. There are splendid opportunities for dairying in this state. Vermont butter already has won a high reputation in the great produce markets and to engage in dairying in Vermont is to follow one of the lines of least resistance. The Vermont Dairymen's Association is the oldest and is said to be the largest of its kind in the country.

MILK SHIPMENTS.

It is not possible to obtain exact information regarding the shipments of milk out of this state, but it is carried on at the present time upon a large scale. This business has grown up largely within a few years. It is impossible at the present time to say how much milk was shipped out of the state when the census figures for dairying were compiled in 1910, or how much, if any, reduction in Vermont's production of butter and cheese has resulted from such shipments.

The bulk of the freight business of Vermont is done by three lines of railroad, although several other roads do considerable Vermont business in the aggregate. One of the most important railroads in Vermont reports that in 1912 it shipped out of the state 1,261 cars of milk, each car containing 300 ten-gallon cans, 1,377 ten-gallon cans in smaller lots and 18,584 ten-gallon cans of cream. This amounts to 3,796,770 gallons of milk and 185,584 gallons of cream or 15,187,080 quarts of milk and 743,360 quarts of cream. Another important Vermont railroad reports that it shipped out of the state during the year 1912, 1,833 cars of milk, each car containing 300 ten-gallon cans, and cream shipments, amounting to 31.63 cars, each containing 300 ten-gallon cans. This represents 5,499,000 gallons of milk, or 21,996,000 quarts, and 94,890 gallons, or 1,122,920 quarts of cream. These two reports, therefore, represent 37,183,080 quarts of milk,

and 1,866,280 quarts of cream. Assuming that the third railroad, which did not report, carried an equal amount—and the other railroads which do a smaller amount of business are likely to bring the total above rather than below the figures quoted—it may be safe to credit the third railroad with shipping 18,600,000 quarts of milk and 930,000 quarts of cream. This would represent practically 56,000,000 quarts of milk and 2,800,000 quarts of cream shipped out of Vermont in 1912; and now, four years later, the volume of their shipments has vastly increased. While it is not claimed that these figures give more than an approximate idea of the extent of the shipments of milk and cream, it will be seen that these shipments are very large when the other branches of Vermont's dairy industry are taken into consideration.

RAISING BEEF CATTLE.

There are also good opportunities in Vermont to produce beef cattle. President E. T. Fairchild of New Hampshire State College, in his inaugural address, called attention to the fact that there were six million fewer cattle in this country than there were ten years previous to the time of his address, while there were ten million more people to be added to the consumers of beef. The manager of the Billings Farm at Woodstock, one of the largest farms in the state, believing in the use of stable manures for maintaining soil fertility, and desiring to have enough stock to consume the hay and roughage grown on the farm, in August, 1911, bought a carload of yearling beef steers in Chicago. In arrival they were turned out to pasture where they remained until fall. During the winter season they were yarded and fed all the hay and roughage they would eat, but no grain. In the spring of 1912 they were turned out again to pasture, where they remained until fall. Then they were taken up and fed for the purpose of fattening, being sold during January and February, 1913, at a good profit. They were fat, handsome, two-year-old beef and brought top prices. The experiment was so satisfactory that another lot of seventy-five head was bought and the process was repeated, this process being considered more profitable than the selling of hay and forage. A letter from the manager of the Billings Farm on the same general subject says: "We are now fattening for early January market, seventy-five head of three-year-old Western steers, imported as yearlings at the approximate cost of \$50 a head. Convincing tests show that these steers gain on an average of from five to eight pounds daily. The daily feed, pro-rated, allowed approximately:

14 lbs. timothy hay	200 lbs. cotton seed
31 lbs. corn ensilage	100 lbs. wheat bran, per steer
12½ lbs. grain mixture	60 lbs. corn meal

"Valuing hay at \$14 per ton, corn ensilage at \$10 per ton, cotton seed at \$30 per ton, bran at \$1.45 per cwt., and corn meal at \$1.60 per cwt., and the daily labor expense of feeding at \$3.50, we reckon each steer costs approximately \$0.48 per day. We ignore, in our cost-calculation shelter, rent and interest on investment.

"In reckoning the probable income, based on the daily gain of these steers, we are compelled to resort to conjecture, for at this distance from market, we are unable either to accurately record, or approximately foresee the pulsations of the beef market. Grounding our estimates on current market conditions, as well as prices, January 1, 1914, we figure to sell our steers at from \$7 to \$10 per cwt. As our grades are about evenly divided we choose a mean of \$8.50 to base our potential income. Choosing a like mean of 6½ pounds, as the average daily gain, we find our steers yielding a daily revenue of \$.55 per head, or \$.07 above cost of daily expense per head. We are content, therefore, to call our steers self-supporting during feeding season and yielding a modest profit during pasture season.

"We are carried away by our figures on the daily excrement of each steer. Exclusive of the litter, each steer yields from 100 to 200 pounds of manure every twenty-four hours. Using a mean of 150 pounds per steer, in the two months of fattening season, each steer yields 4½ tons of excrement. Considering the manurial value of \$10 worth of timothy hay, worth \$5.10; corn ensilage, \$3.86; wheat bran, \$8.33; cotton seed meal, \$10.05 (figures by Armsby) we learn that for each \$10 worth of our feed and grain ration we prepare a manurial value of approximately \$22 worth of excrement, based on our daily rations. For the feeding season, the steer excrement should be worth approximately \$1,300. Figuring the excrement per steer per fattening season of sixty days at (4½ tons as before noted) seventy-five steers would yield 337.5 tons of manure, which valued at \$4 per ton would again show an approximate total value of manure of \$1,300, which amount checks with the previous figures. Each steer during the fattening season produces manure valued at approximately \$.28 per day.

"As we noted the primary cost of our feeders at \$50 per head, we supplement the figures with the estimate that our three-year-old steers on January 1, 1915, will be worth from \$90 to \$150, and we have therefore more than doubled in value.

"The foregoing estimates were based on personal tests, and on figures by Heiden, Boussingault, Hofmeister, Armsby, and on government records covering similar enterprises.

"It is clearly evident, therefore, that the project of Western feeders can be made profitable for New England stock farmers. The young steers fertilize pastures, and with their natural growth, more than pay pasture rent, taxes and interest on land and stock;

by judicious feeding, they are self-supporting during the fattening season, and by efficient harvesting of the excrement, the steers turn rich grain into richer manure and when ready for midwinter market, by shrewd marketing, may be made to win a modest profit on the primary investment.

"The three factors necessary to make the enterprise profitable are obviously an abundance of cheap pasture, an efficient arrangement making possible a maximum saving of the manure during fattening season, and a market affiliation capable of ensuring against the collusions prevalent among sectional cattle buyers and commission merchants.

"With our next importation of Western 'feeders' we intend installing an accurate cost accounting system covering the steer enterprise throughout its course. One year's experiment under this method should reveal the exact profit in dollars and cents, whereas now we are compelled to ground our conclusions very largely on approximation.

"The steer experiment of the past few years has clearly convinced us that a stanchion system is essential, both to efficient fattening results, and also to efficient conservation of the urine, the most valuable part of the excreta of animals. We intend to provide stanchions, coursed by concrete gutters for one hundred steers or more, in the effort to make the enterprise productive of the maximum profit."

That the raising of cattle is likely to be profitable for an indefinite period is indicated in an address delivered by J. A. Spoor, chairman of the board of directors of the Union Stock Yards in Chicago. He summed up the whole situation as follows:

"1. There is a world shortage of cattle and cheap beef is a thing of the past.

"2. The farmers and stock raisers of the United States have nothing to fear in the way of cattle or beef competition, from either Mexico, Canada or South America during the next decade or longer.

"3. Henceforth the corn belt farms must be looked to more than ever before for our domestic beef supply or else the American people must face a beef famine.

"4. To save the calves and to breed and raise more and better cattle on their farms, is not only a duty which the corn belt farmers owe to their country, but also a necessity for preservation of the declining fertility of their own lands."

With Vermont's superior pasture land and the ability to raise large crops of corn, an excellent opportunity is afforded not only to increase the dairying industry, but also to raise beef cattle in considerable quantities for a market in which the demand exceeds the supply. Briefly stated, Vermont's advantages as a dairy state are her shady and well-watered hill pastures,



BROWN SWISS COW, CHAMPION 3-YEAR-OLD OF UNITED STATES.

Property of T. N. Vall.

her sweet and nutritious grasses in great abundance, her large acreage of forage crops, and her numerous silos.

VERMONT DAIRY RECORDS.

While the principal breeds of dairy cows in Vermont are Holsteins, Jerseys, Ayrshires and Guernseys, several other breeds are well represented. The Brown Swiss cow "Hirz," in the Speedwell Farms' herd at Lyndon, Vt., owned by T. N. Vail, has a record of producing 14,067 pounds of milk, and 723 pounds of butter in one year. Mr. Vail's Brown Swiss "Kundry" holds the three-year old champion record for the United States with a record of 14,087.4 pounds of milk and 574.52 pounds of butter fat to her credit. "Successful Queen", a Jersey cow bred by J. C. Greene of East Bethel, produced 13,088 lbs., 6.4 oz. of milk and 682 lbs., 7.5 ozs. of butter fat in one year. "Foxforda" a Jersey cow owned by Mrs. F. D. Erhardt of West Berlin, produced in one year 14,363 lbs., 6.4 oz. of milk and 676 lbs., 12.7 oz. of butter fat. "Triple Champion's Marva", a Guernsey cow owned by Edward R. Andrews of Putney, produced in one year 14,370.3 lbs. of milk and 703.27 lbs. of butter fat. "Noblesse 3rd", a Guernsey cow owned by Edward R. Andrews of Putney, produced in one year 12,399.5 lbs. of milk and 717.67 lbs. of butter fat. A Vermont cow, "Lily Garfield", from the herd of Frederick Billings of Woodstock, took first prize in the twenty-one day test at the Chicago World's Fair, producing 563 pounds of milk, which made 29 pounds of butter.

Following are tables based on some United States census figures, giving practical illustrations of Vermont's standing as a dairy state:

RATIO OF DAIRY COWS TO POPULATION IN 1909.

Alabama	1 to 5.4	Nebraska	1 to 1.9
Arizona	1 to 7.0	Nevada	1 to 4.7
Arkansas	1 to 3.6	New Hampshire	1 to 4.2
California	1 to 5.0	New Jersey	1 to 16.4
Colorado	1 to 5.5	New Mexico	1 to 6.3
Connecticut	1 to 9.0	New York	1 to 6.0
Delaware	1 to 5.6	North Carolina	1 to 7.1
Florida	1 to 6.4	North Dakota	1 to 2.2
Georgia	1 to 6.4	Ohio	1 to 5.2
Idaho	1 to 3.7	Oklahoma	1 to 3.1
Illinois	1 to 5.3	Oregon	1 to 3.8
Indiana	1 to 4.2	Pennsylvania	1 to 8.2
Iowa	1 to 1.5	Rhode Island	1 to 23.2
Kansas	1 to 2.3	South Carolina	1 to 8.2
Kentucky	1 to 5.5	South Dakota	1 to 1.5
Louisiana	1 to 5.9	Tennessee	1 to 5.5
Maine	1 to 4.7	Texas	1 to 3.8
Maryland	1 to 7.1	Utah	1 to 4.9
Massachusetts	1 to 19.5	Vermont	1 to 1.3
Michigan	1 to 3.6	Virginia	1 to 5.7
Minnesota	1 to 1.9	Washington	1 to 6.1
Mississippi	1 to 4.1	West Virginia	1 to 5.0
Missouri	1 to 3.8	Wisconsin	1 to 1.5
Montana	1 to 4.8	Wyoming	1 to 4.4

PER CAPITA VALUE OF SPECIFIED DAIRY PRODUCTS SOLD BY FARMERS IN 1909, INCLUDING MILK, CREAM, BUTTER FAT, BUTTER AND CHEESE.

Alabama	\$ 0.63	Maine	\$ 9.05
Arizona	4.12	Maryland	3.69
Arkansas	0.95	Massachusetts	4.40
California	8.02	Michigan	7.86
Colorado	4.26	Minnesota	12.14
Connecticut	6.57	Mississippi	0.55
Delaware	4.77	Missouri	2.48
Florida	0.76	Montana	4.37
Georgia	0.75	Nebraska	6.40
Idaho	4.20	Nevada	5.41
Illinois	4.73	New Hampshire	11.91
Indiana	4.72	New Jersey	3.81
Iowa	11.43	New Mexico	1.32
Kansas	5.64	New York	8.22
Kentucky	1.62	North Carolina	0.81
Louisiana	0.95	North Dakota	4.98

Ohio	\$ 5.36	Utah	\$ 4.41
Oklahoma	2.03	Vermont	32.31
Oregon	7.68	Virginia	1.82
Pennsylvania	5.00	Washington	6.73
Rhode Island	3.71	West Virginia	2.07
South Carolina	0.41	Wisconsin	21.95
South Dakota	7.70	Wyoming	2.32
Tennessee	1.47		
Texas	1.40	Ave. for United States	\$5.15

POUNDS OF BUTTER PER CAPITA IN 1909.

Alabama	(No record)	Nebraska	41.9
Arizona	6.7	Nevada	17.6
Arkansas	19.8	New Hampshire	15.8
California	22.1	New Jersey	1.7
Colorado	15.2	New Mexico	(No record)
Connecticut	4.8	New York	7.6
Delaware	10.8	North Carolina	11.8
Florida	2.2	North Dakota	34.8
Georgia	10.4	Ohio	17.0
Idaho	18.1	Oklahoma	18.8
Illinois	12.6	Oregon	21.0
Indiana	20.3	Pennsylvania	11.9
Iowa	57.2	Rhode Island	(No record)
Kansas	28.5	South Carolina	8.1
Kentucky	16.8	South Dakota	39.6
Louisiana	(No record)	Tennessee	18.2
Maine	20.7	Texas	17.2
Maryland	7.6	Utah	16.6
Massachusetts	1.5	Vermont	96.6
Michigan	30.5	Virginia	13.0
Minnesota	59.5	Washington	15.8
Mississippi	15.9	West Virginia	(No record)
Missouri	15.9	Wisconsin	56.0
Montana	10.9	Wyoming	13.5

POUNDS OF BUTTER PER FARM, 1909.

Alabama	(No record)	Illinois	286.5
Arizona	149.5	Indiana	254.7
Arkansas	150.3	Iowa	586.3
California	596.2	Kansas	271.6
Colorado	264.4	Kentucky	149.2
Connecticut	203.2	Louisiana	(No record)
Delaware	202.1	Maine	256.6
Florida	34.0	Maryland	201.5
Georgia	93.8	Massachusetts	142.2
Idaho	191.4	Michigan	415.1

Minnesota	791.3	Oregon	310.7
Mississippi	104.7	Pennsylvania	417.8
Missouri	188.8	Rhode Island	(No record)
Montana	157.4	South Carolina	42.3
Nebraska	385.2	South Dakota	297.8
Nevada	536.8	Tennessee	161.8
New Hampshire	728.5	Texas	115.4
New Jersey	131.1	Utah	286.9
New Mexico	(No record)	Vermont	1112.6
New York	321.7	Virginia	145.6
North Carolina	102.6	Washington	321.2
North Dakota	270.2	West Virginia	(No record)
Ohio	297.9	Wisconsin	740.0
Oklahoma	163.8	Wyoming	179.8

AVERAGE NUMBER OF POUNDS OF BUTTER PER COW PRODUCED IN 1909.

Alabama	(No record)	Nebraska	81.3
Arizona	47.8	Nevada	85.0
Arkansas	71.0	New Hampshire	67.0
California	112.5	New Jersey	28.4
Colorado	84.3	New Mexico	(No record)
Connecticut	44.3	New York	45.9
Delaware	61.3	North Carolina	84.3
Florida	14.6	North Dakota	75.5
Georgia	67.0	Ohio	89.5
Idaho	68.3	Oklahoma	58.7
Illinois	67.7	Oregon	81.9
Indiana	86.6	Pennsylvania	98.1
Iowa	83.4	Rhode Island	(No record)
Kansas	65.6	South Carolina	68.1
Kentucky	94.3	South Dakota	62.5
Louisiana	(No record)	Tennessee	100.2
Maine	98.2	Texas	66.2
Maryland	59.0	Utah	82.0
Massachusetts	30.5	Vermont	133.3
Michigan	112.0	Virginia	75.2
Minnesota	113.8	Washington	96.9
Mississippi	66.8	West Virginia	(No record)
Missouri	61.0	Wisconsin	88.9
Montana	53.2	Wyoming	60.4

PER CAPITA VALUE OF DAIRY COWS IN 1910.

Alabama	\$ 4.00	Colorado	\$ 7.46
Arizona	6.22	Connecticut	4.50
Arkansas	6.04	Delaware	6.50
California	7.82	Florida	2.68

Georgia	\$ 3.21	New Mexico	\$ 5.21
Idaho	10.54	New York	7.58
Illinois	7.30	North Carolina	3.55
Indiana	8.84	North Dakota	15.14
Iowa	21.86	Ohio	7.12
Kansas	14.31	Oklahoma	9.69
Kentucky	5.99	Oregon	9.36
Louisiana	3.58	Pennsylvania	4.71
Maine	7.91	Rhode Island	2.00
Maryland	4.30	South Carolina	3.11
Massachusetts	2.32	South Dakota	19.17
Michigan	10.43	Tennessee	5.49
Minnesota	16.03	Texas	7.09
Mississippi	5.34	Utah	6.92
Missouri	9.29	Vermont	26.76
Montana	9.06	Virginia	4.98
Nebraska	16.61	Washington	6.99
Nevada	8.09	West Virginia	6.19
New Hampshire	9.09	Wisconsin	21.81
New Jersey	2.81	Wyoming	9.50

ALL CATTLE PER SQUARE MILE IN 1909.

Alabama	17	Nebraska	35
Arizona	7	Nevada	4
Arkansas	19	New Hampshire	18
California	13	New Jersey	28
Colorado	10	New Mexico	9
Connecticut	39	New York	43
Delaware	26	North Carolina	13
Florida	14	North Dakota	10
Georgia	18	Ohio	44
Idaho	5	Oklahoma	27
Illinois	43	Oregon	7
Indiana	37	Pennsylvania	35
Iowa	79	Rhode Island	27
Kansas	37	South Carolina	12
Kentucky	24	South Dakota	19
Louisiana	16	Tennessee	21
Maine	7	Texas	26
Maryland	23	Utah	4
Massachusetts	20	Vermont	45
Michigan	25	Virginia	22
Minnesota	28	Washington	5
Mississippi	21	West Virginia	25
Missouri	36	Wisconsin	47
Montana	6	Wyoming	7

ALL DAIRY COWS PER SQUARE MILE IN 1909.

Alabama	7.4	Nebraska	7.9
Arizona	0.2	Nevada	0.1
Arkansas	7.9	New Hampshire	10.8
California	2.9	New Jersey	19.7
Colorado	1.3	New Mexico	0.4
Connecticut	24.6	New York	30.7
Delaware	17.4	North Carolina	5.9
Florida	1.9	North Dakota	3.6
Georgia	6.8	Ohio	22.0
Idaho	1.1	Oklahoma	7.5
Illinois	18.5	Oregon	1.7
Indiana	17.4	Pennsylvania	20.6
Iowa	25.0	Rhode Island	18.6
Kansas	8.9	South Carolina	5.8
Kentucky	10.1	South Dakota	4.7
Louisiana	5.5	Tennessee	9.4
Maine	4.7	Texas	3.8
Maryland	13.6	Utah	0.8
Massachusetts	20.6	Vermont	27.7
Michigan	13.0	Virginia	8.3
Minnesota	13.0	Washington	2.6
Mississippi	9.1	West Virginia	9.6
Missouri	12.3	Wisconsin	26.2
Montana	0.5	Wyoming	0.3

CROP YIELDS.

Vermont has no reason to apologize for her crop yields when compared with those of other states, although it is true that more intensive cultivation and a wider use of scientific methods of agriculture would make Vermont farms still more fruitful. According to the last census report, the total value of Vermont crops in 1909 amounted to \$27,446,836. The value of the silver output of the United States, including Alaska, for the same year, exceeded the value of Vermont crops by only \$1,008,364. The following tables which show the average yield per acre, the average per bushel, ton or pound, and the average returns per acre for the periods 1870-1909, and 1913-1914, for nine staple crops, both for Vermont and for the United States, taken from the United States census reports and crop statistics issued by the United States Department of Agriculture, show how far the Vermont average exceeds the United States average in almost every instance:

AVERAGE YIELD, PRICE AND RETURNS PER ACRE OF STAPLE CROPS IN UNITED STATES AND VERMONT, 1870-1909.

	United States	Vermont
	Corn	
Average yield per acre	25.2 bu.	35.6 bu.
Average price	\$ 0.408 per bu.	\$ 0.687 per bu.
Average returns per acre	\$10.281	\$24.457
	Wheat	
Average yield per acre	12.9 bu.	19.0 bu.
Average price	\$ 0.813 per bu.	\$ 1.112 per bu.
Average returns per acre	\$10.487	\$21.128
	Oats	
Average yield per acre	27.6 bu.	35.1 bu.
Average price	\$ 0.322 per bu.	\$ 0.435 per bu.
Average returns per acre	\$ 8.887	\$15.268
	Barley	
Average yield per acre	23.3 bu.	27.3 bu.
Average price	\$ 0.551 per bu.	\$ 0.69 per bu.
Average returns per acre	\$12.838	\$18.837
	Rye	
Average yield per acre	14.0 bu.	15.9 bu.
Average price	\$ 0.604 per bu.	\$ 0.782 per bu.
Average returns per acre	\$ 8.456	\$12.433
	Potatoes	
Average yield per acre	83.0 bu.	112.5 bu.
Average price	\$ 0.527 per bu.	\$ 0.492 per bu.
Average returns per acre	\$43.741	\$55.35

	Buckwheat	
Average yield per acre	16.5 bu.	21.9 bu.
Average price	\$ 0.612 per bu.	\$ 0.572 per bu.
Average returns per acre	\$10.098	\$12.526
	Hay	
Average yield per acre	1.28 tons	1.15 tons
Average price	\$ 9.33 per ton	\$10.465 per ton
Average returns per acre	\$11.942	\$12.034
	Tobacco	
Average yield per acre	747.6 lbs.	1533.7 lbs.
Average price	\$ 0.081 per lb.	\$ 0.153 per lb.
Average returns per acre	\$60.555	\$234.656
Average returns per acre for all crops:		
United States,	\$19.676.	
Vermont,	\$45.187.	

**AVERAGE YIELD, PRICE AND RETURNS PER ACRE OF
NINE STAPLE CROPS IN UNITED STATES AND
VERMONT, 1913-1914.**

	United States	Vermont
	Corn	
Average yield per acre	24.4 bu.	42.0 bu.
Average price	\$ 0.664 per bu.	\$ 0.81 per bu.
Average returns per acre	\$16.201	\$34.02
	Spring Wheat	
Average yield per acre	12.4 bu.	26.7 bu.
Average price	\$ 0.86 per bu.	\$ 1.00 per bu.
Average returns per acre	\$10.664	\$26.70
	Oats	
Average yield per acre	29.4 bu.	40.7 bu.
Average price	\$ 0.415 per bu.	\$ 0.535 per bu.
Average returns per acre	\$12.201	\$21.774
	Barley	
Average yield per acre	24.8 bu.	33.2 bu.
Average price	\$ 0.54 per bu.	\$ 0.81 per bu.
Average returns per acre	\$13.392	\$26.892
	Rye	
Average yield per acre	16.5 bu.	19 bu.
Average price	\$ 0.749 per bu.	\$ 0.85 per bu.
Average returns per acre	\$12.358	\$16.15
	Potatoes	
Average yield per acre	99.9 bu.	147.5 bu.
Average price	\$ 0.588 per bu.	\$ 0.595 per bu.
Average returns per acre	\$ 58.741	\$87.762
	Buckwheat	
Average yield per acre	19.2 bu.	26.5 bu.
Average price	\$ 0.759 per bu.	\$ 0.81 per bu.
Average returns per acre	\$14.572	\$21.465

	Hay	
Average yield per acre	1.37 tons	1.24 tons
Average price	\$11.77 per ton	\$14.55 per ton
Average returns per acre	\$16.124	\$18.042
	Tobacco	
Average yield per acre	815 lbs.	1625 lbs.
Average price	\$ 0.113 per lb.	\$ 0.18 per lb.
Average returns per acre	\$92.095	\$292.50
Average returns per acre for all crops 1913-1914:		
United States,	\$27.372.	
Vermont,	\$60.589.	

VALUE OF ALL CROPS PER CAPITA OF RURAL POPULATION IN 1909.

Alabama	\$ 81.62	Nebraska	\$222.52
Arizona	38.95	Nevada	86.46
Arkansas	87.78	New Hampshire	91.04
California	168.65	New Jersey	64.03
Colorado	129.31	New Mexico	31.78
Connecticut	195.60	New York	108.48
Delaware	86.66	North Carolina	75.69
Florida	67.73	North Dakota	351.55
Georgia	109.44	Ohio	109.58
Idaho	134.36	Oklahoma	99.81
Illinois	172.21	Oregon	134.09
Indiana	130.50	Pennsylvania	54.94
Iowa	203.70	Rhode Island	219.26
Kansas	179.47	South Carolina	110.01
Kentucky	80.24	South Dakota	247.44
Louisiana	66.67	Tennessee	69.92
Maine	108.93	Texas	42.40
Maryland	68.93	Utah	92.23
Massachusetts	132.53	Vermont	146.76
Michigan	74.94	Virginia	63.42
Minnesota	157.88	Washington	147.14
Mississippi	92.66	West Virginia	40.66
Missouri	116.47	Wisconsin	111.58
Montana	122.46	Wyoming	30.50

VERMONT AND IOWA COMPARED.

Director of the Census Durand said in a magazine article that Iowa, perhaps, was the greatest farming state in the Union, and that although Iowa was second to Illinois in value of farm products, yet it was more typically an agricultural state. This statement being made on such high authority, it may be of interest

to compare crop yields and crop values in Vermont with those of Iowa. The first comparison will be for the forty-year period, 1870 to 1909, inclusive.

	Iowa	Vermont
	Corn	
Average yield per acre	32 bu.	35.6 bu.
Average price	\$0.302 per bu.	\$ 0.687 per bu.
Average returns per acre	\$9.664	\$24.457
	Wheat	
Average yield per acre	12.6 bu.	19 bu.
Average price	\$ 0.697 per bu.	\$ 1.112 per bu.
Average returns per acre	\$ 8.782	\$21.128
	Oats	
Average yield per acre	31.8 bu.	35.1 bu.
Average price	\$ 0.247 per bu.	\$ 0.435 per bu.
Average returns per acre	\$ 7.854	\$15.268
	Barley	
Average yield per acre	23.8 bu.	27.3 bu.
Average price	\$ 0.425 per bu.	\$ 0.69 per bu.
Average returns per acre	\$10.115	\$18.837
	Rye	
Average yield per acre	16.3 bu.	15.9 bu.
Average price	\$ 0.472 per bu.	\$0.782 per bu.
Average returns per acre	\$ 7.693	\$12.433
	Potatoes	
Average yield per acre	82.2 bu.	112.5 bu.
Average price	\$ 0.455 per bu.	\$ 0.492 per bu.
Average returns per acre	\$37.401	\$55.35
	Buckwheat	
Average yield per acre	14.4 bu.	21.9 bu.
Average price	\$ 0.665 per bu.	\$ 0.572 per bu.
Average returns per acre	\$ 9.576	\$12.526
	Hay	
Average yield per acre	1.39 tons	1.15 tons
Average price	\$ 5.61 per ton	\$10.465 per ton
Average returns per acre	\$ 7.797	\$12.034

Average returns per acre for eight staple crops mentioned:

Iowa, \$12.36.

Vermont \$21.504.

The following comparisons are for the years 1913-1914.

	Iowa	Vermont
	Corn	
Yield per acre in 1914	38 bu.	47 bu.
Average yield per acre 1913-14	36.8 bu.	42 bu.

Average returns per acre 1913-1914	\$19.80	\$34.02
Price paid farmers Dec. 1, 1914	\$ 0.50 per bu.	\$ 0.81 per bu.
Average price paid 1913-1914	\$ 0.55 per bu.	\$ 0.81 per bu.
Spring Wheat		
Yield per acre in 1914	13.5 bu.	29 bu.
Average yield per acre 1913-1914	15.2 bu.	26.7 bu.
Average returns per acre 1913-1914	\$13.07	\$26.70
Price paid farmers Dec. 1, 1914	\$ 0.96 per bu.	\$ 1.00 per bu.
Average price paid 1913-1914	\$ 0.86 per bu.	\$ 1.00 per bu.
Oats		
Yield per acre in 1914	33.0 bu.	42.5 bu.
Average yield per acre 1913-1914	33.7 bu.	40.7 bu.
Average returns per acre 1913-1914	\$12.637	\$21.774
Price paid farmers Dec. 1, 1914	\$ 0.41 per bu.	\$ 0.55 per bu.
Average price paid 1913-1914	\$ 0.375	\$ 0.535 per bu.
Barley		
Yield per acre in 1914	26.0 bu.	34.5 bu.
Average yield per acre 1913-1914	25.5 bu.	33.2 bu.
Average returns per acre 1913-1914	\$14.025	\$26.892
Price paid farmers Dec. 1, 1914	\$ 0.55 per bu.	\$ 0.75 per bu.
Average price paid 1913-1914	\$ 0.55 per bu.	\$ 0.775 per bu.
Rye		
Yield per acre in 1914	19.0 bu.	20 bu.
Average yield per acre 1913-1914	18.6 bu.	19 bu.
Average returns per acre 1913-1914	\$12.741	\$16.15
Price paid farmers Dec. 1, 1914	\$ 0.77 per bu.	\$ 0.80 per bu.
Average price paid 1913-1914	\$ 0.685 per bu.	\$ 0.85 per bu.
Potatoes		
Yield per acre in 1914	86 bu.	168 bu.
Average yield per acre 1913-1914	67 bu.	147.5 bu.
Average returns per acre 1913-1914	\$47.235	\$87.762
Price paid farmers Dec. 1, 1914	\$ 0.59 per bu.	\$ 0.47 per bu.
Average price paid 1913-1914	\$ 0.705 per bu.	\$ 0.595 per bu.
Buckwheat		
Yield per acre in 1914	18.3 bu.	28 bu.
Average yield per acre 1913-1914	16.1 bu.	26.5 bu.

Average returns per acre 1913-1914	\$12.719	\$21.465
Price paid farmers Dec. 1, 1914	\$ 0.79 per bu.	\$ 0.82 per bu.
Average price paid 1913-1914	\$ 0.832 per bu.	\$ 0.81 per bu.
	Hay	
Yield per acre in 1914	1.38 tons	1.20 tons
Average yield per acre 1913-1914	1.43 tons	1.24 tons
Average returns per acre 1913-1914	\$14.085	\$18.042
Price paid farmers Dec. 1, 1914	\$10.10 per ton	\$14.60 per ton
Average price paid 1913-1914	\$9.85 per ton	\$14.55 per ton
Average returns per acre for eight staple crops mentioned:		
Iowa	\$18.291.	
Vermont	\$31.605.	

OTHER COMPARISONS.

The following are comparisons of Vermont crop yields and crop values with those of a few of the leading agricultural states of the Middle West, in addition to the Iowa comparisons:

VERMONT.

(1870-1909)

	Average Yield per acre	Average Price	Average Re- turns per acre
Corn	35.6 bu.	\$ 0.687 per bu.	\$ 24.457
Wheat	19. bu.	1.112 per bu.	\$ 21.128
Oats	35.1 bu.	0.435 per bu.	\$ 15.268
Barley	27.3 bu.	\$ 0.69 per bu.	\$ 18.837
Rye	15.9 bu.	\$ 0.782 per bu.	\$ 12.433
Potatoes	112.5 bu.	\$ 0.492 per bu.	\$ 55.35
Buckwheat	21.9 bu.	\$ 0.572 per bu.	\$ 12.526
Hay	1.15 tons	\$10.465 per ton	\$ 12.034
Tobacco	1533.7 lbs.	\$ 0.153 per lb.	\$234.656

OHIO.

(1870-1909)

	Average Yield per acre	Average Price	Average Re- turns per acre
Corn	33.4 bu.	\$0.412 per bu.	\$13.76
Wheat	14.2 bu.	\$0.89 per bu.	\$12.639
Oats	30.7 bu.	\$0.317 per bu.	\$ 9.731
Barley	24.7 bu.	\$0.617 per bu.	\$15.239

Rye	14.5 bu.	\$0.61 per bu.	\$ 8.845
Potatoes	75. bu.	\$0.552 per bu.	\$41.40
Buckwheat	14.5 bu.	\$0.687 per bu.	\$ 9.861
Hay	1.24 tons	\$9.905 per ton	\$12.282
Tobacco	849. lbs.	\$0.073 per lb.	\$61.977

INDIANA.

(1870-1909)

	Average Yield per acre	Average Price	Average Re- turns per acre
Corn	31.8 bu.	\$0.367 per bu.	\$11.67
Wheat	13.4 bu.	\$0.85 per bu.	\$11.39
Oats	27.4 bu.	\$0.297 per bu.	\$ 8.137
Barley	22.8 bu.	\$0.612 per bu.	\$13.953
Rye	13.7 bu.	\$0.585 per bu.	\$ 8.014
Potatoes	69.7 bu.	\$0.552 per bu.	\$38.474
Buckwheat	14.3 bu.	\$0.667 per bu.	\$ 9.528
Hay	1.28 tons	\$9.037 per ton	\$11.567
Tobacco	728 lbs.	\$0.066 per lb.	\$48.048

ILLINOIS.

(1870-1909)

	Average Yield per acre	Average Price	Average Returns per acre
Corn	30.8 bu.	\$0.347 per bu.	\$10.687
Wheat	13.6 bu.	\$0.81 per bu.	\$11.016
Oats	31.2 bu.	\$0.277 per bu.	\$ 8.642
Barley	23.8 bu.	\$0.542 per bu.	\$12.899
Rye	16.1 bu.	\$0.542 per bu.	\$ 8.726
Potatoes	75.2 bu.	\$0.575 per bu.	\$43.24
Buckwheat	13.6 bu.	\$0.692 per bu.	\$ 9.411
Hay	1.30 tons	\$8.285 per ton	\$10.77
Tobacco	676.7 lbs.	\$0.075 per lb.	\$50.725

The old days when cotton was king of American crops passed long ago. Today corn is king, with no rival to dispute his right to reign. Even in the South, where cotton was raised almost exclusively for many years, corn is now one of the principal crops, and some of the leading corn growing states of the Union are found in the South. People have become accustomed to the idea that corn can be grown successfully only in the Middle West. This idea is erroneous, and there are facts in abundance to prove this assertion.

The *Boston Transcript* has said: " 'Till Birnam Wood shall come to Dunsinane' was intended to phrase the immovability of rooted, growing things. Yet Birnam Wood came to Dunsinane for all that. And when we speak of the great 'corn belt' as being in the Mississippi valley, as we have habitually done for several decades, it does not banish the possibility of the corn belt moving eastward, if not in the ratio of productivity per acre. This curious process has, in fact, begun. The New Englander migrated to the Middle West and applied himself to the business of corn raising. Now the business of corn raising is migrating back to New England.

"This gradual and significant increase in New England's yield per acre of corn is the more curious to watch, inasmuch as we have been so long accustomed to think of corn in terms of the Middle West. Yet the government crop reports of recent years show with all the precision of a geometrical theorem the increased and increasing yield within our own region until as long ago as 1910 the average yield per acre in the New England states was forty-six bushels, as against thirty-nine bushels per acre in Illinois and thirty-six bushels per acre in Iowa, long reputed to be the two leading states of the Middle West in the production of corn. What is more, the yield per acre in New England is steadily increasing; which brings us to the economic strategies of fertilizer. For when these rich Middle Western farms were new and needed no fertilizer, the leaner land of our New England farms, which required dressing, could not compete. Within the last five years, however, Illinois has begun to use fertilizer (in common with other Mississippi states), which means that the farms of New England are once more on a competitive footing. They are more. They are close to the big Eastern markets and they are on the cis-Alpine side of the expensive freight haul over the Berkshire range. As lately as three years ago the average worth to a Maine farmer of an acre of corn was \$32, as against \$13.07 in Iowa. A large part of this difference lay in freight, some of it was to be accounted for by a surplus of production in Iowa and a part by Maine's proximity to the markets; but the tendency is a fact and a significant one."

The same logic applies to conditions in Vermont. The scientists say that corn is a sub-tropical plant which possesses a quality peculiar to every variety to thrive best near the northern limits of its possible growth. It is certain that in recent years New England has been leading the United States in bushels of corn per acre.

The story which government statistics tell concerning corn yields in Vermont is both interesting and significant. In 1914 no state surpassed Vermont in bushels of corn per acre, and only one state equalled that yield, an average of 47 bushels per acre, compared with an average of 25.8 bushels per acre for the United States. In recent years Illinois and Iowa have led the Union in quantity of corn produced. Illinois has equalled the Vermont yield in bushels per acre only once during the past six years and Iowa has equalled or surpassed it only once.

In 1913 Vermont's average yield was 37 bushels per acre, while that of the United States was 23.1 bushels per acre. In 1912 Vermont's average yield was 40 bushels per acre while that of the United States was 29.2 bushels per acre. In 1911 the Vermont average was 41 bushels and that of the United States was 23.9 bushels. In 1910 the Vermont average was 43 bushels and United States' average 27.7 bushels. In 1909 Vermont produced an average yield of 40 bushels, compared with an average yield of 25.9 bushels for the United States. Vermont's average yield for the past six years is 41.5 bushels, while the average yield for the United States for the same period is 25.9 bushels. Compared with Vermont's average of 47 bushels per acre in 1914, Kansas shows an average yield of 18.5 bushels; Nebraska, 24.5 bushels; North Dakota, 28 bushels; Oklahoma, 12.5 bushels; South Dakota, 26 bushels.

As already shown, Vermont led the Union in bushels of corn per acre for the forty-year period, 1870-1909—not every year, but the Vermont average was the highest for the entire period. Vermont's average yield for the forty-year period was 35.6 bushels compared with an average of 25.3 bushels for the United States as a whole. The average price to farmers December 1st for the period was \$0.687 per bushel in Vermont and \$0.408 per bushel for the entire country. The average returns of corn land per acre for the period were \$24.457 in Vermont and less than half as much, or \$10.281 for the whole country.

These facts furnish indisputable proof that Vermont can raise more bushels of corn per acre than most of the states of the Union, and that prices paid in Vermont are larger than in most sections of the country. Of course the New England farms are smaller than many of those of the West, and for a considerable period corn is not likely to be raised in this section in any considerable quantity for shipment. The New England states with such a record of crop yield ought to raise their own corn, and yet in 1910

this group of states bought 11,000,000 bushels of corn from the West. There are great opportunities in Vermont for raising corn for feeding purposes, thus avoiding the large expense of buying stock foods, and at the same time maintaining and building up the fertility of the soil. For several years a State Corn Show has been held at Windsor, Vt., in the big riding arena owned by F. A. Kennedy of New York, under the auspices of the Windsor County Y. M. C. A.

The Windsor County Y. M. C. A. has organized boys' corn clubs which have done excellent work. It has purchased prize winning corn that it might be able to furnish high grade seed for the contests. An eighth of an acre was the size of each corn plot. These contests have stimulated both the boys and the boys' fathers to adopt better agricultural methods. Twenty bushels of ears of corn have been raised on an eighth of an acre, at the rate of 160 bushels to the acre. The experts of the Illinois College of Agriculture average only 87 bushels to the acre. One father, who had sold his farm, purchased it again as a result of his son's interest and success in corn growing. One boy missed his train and walked nineteen miles to be present in time for the judging of his corn exhibit. One mother, seeing her boy's interest in corn growing, saved her butter money to send him to the State Agricultural School.

J. Wade Webster of Hartland, Vt., won the sweepstakes prize for the best single ear of corn grown by boys in Vermont, New Hampshire or Maine at the New England Corn Exposition, held at Boston in 1912.

A North Clarendon farmer for several years has been growing and selling seed corn of the flint varieties and he has supplied customers in South Africa, Central and Northern Europe and the British Isles. Not long ago he received an order for 25,000 bushels packed for export.

The outlook is encouraging for more intensive corn growing and Vermont's possibilities already demonstrated, the state offers great opportunities for the profitable growing of this staple crop.

The Vermont Experiment Station recently issued Bulletin 189—"Concerning the Corn Crop", a 50-page pamphlet dealing with the seed, soil, harvest and feeding of corn and containing an exhaustive list of federal and state publications touching the corn crop. It is free of charge and sent for the asking of the Experiment Station, Burlington, Vt.

WHEAT.

Probably the average reader would expect that an article on wheat growing in Vermont would require about as much space as that taken by the famous chapter on "Snakes in Ireland."

It is necessary however, to shatter another erroneous impression. Although wheat is not grown on a large scale in Vermont, spring wheat is grown here, to some extent, as every issue of the annual government bulletin containing crop yields will show, and Vermont's rank in bushels per acre is almost at the top of the list. Last year only one state, and that one in the irrigated region of the Far West, surpassed Vermont in the yield of spring wheat per acre. Vermont's average for the years 1913-1914 was 26.7 bushels, while the average yield for the entire United States for the same period was 12.4 bushels. North Dakota raises more spring wheat than any other state. The average yield in that state for the past two years was 10.8 bushels, or considerably less than half the Vermont average. Other states that approach North Dakota in the amount of spring wheat raised are Minnesota and South Dakota. Minnesota's two-year average was 13.3 bushels and that of South Dakota 9 bushels.

The census reports for the forty-year period, 1870-1909, show that only two states surpassed Vermont in number of bushels of wheat per acre for that time. Vermont's average was 19 bushels and the average for the entire country was 12.9 bushels. The average returns from an acre of wheat land in Vermont for the period 1870-1909 amounted to \$21.128, and in the whole country for the same forty-year period, \$10.487, or less than half the Vermont average.

In a recent issue the *Country Gentleman* said: "Irrigation farming to be successful must always be in nature of intensive farming. Forty acres is about the maximum of acreage that one farmer can operate properly. This is the judgment of experience. Intensive wheat farming is practiced in a number of the humid states. Of those which have small areas in wheat, Vermont takes the front place. In 1909 the Department of Agriculture received reports from five wheat farmers in the Green Mountain state, each growing about eight acres. (Of course this does not mean that these five farmers are the only ones who raise wheat. This refers to special reports by these particular farmers.) The expense is quite high. The Vermont wheat farmer of this type expends more for fertilizer than the total cost of the entire crop in Nebraska, excluding land interest. His fertilizer bill is \$6.75 an acre; he spends \$3.00 for preparing the ground, which again is twice as much as the Nebraska wheat farmer spends for the same purpose. The Vermonter spends \$2.75 for seed, while the Nebraskan spends but \$1.28 and the Wyoming man \$1.45; it costs the Vermont man \$1.31 to plant his acre of wheat, the Illinois man \$0.35, the Nebraskan \$0.44, the Minnesotan \$0.42.

"And so the items of expense run—from two to three times as much in Vermont as in the other wheat states where intensive wheat growing is not practiced, until it gets to the item of land rent or interest on the value of the land. The Vermont wheat

land is valued at \$50 an acre, approximately the same as in Minnesota; less than half as much as in Illinois; 50 per cent less than in Nebraska.

"And when the Vermont small wheat grower has figured up his total he finds he has spent \$23 to grow an acre of wheat, but when he harvests his crop he gets 36.2 bushels which he sells at the rate of \$1.18, or a total of \$42.71. And when he figures his net profit he finds he has made \$19.71 an acre; \$157.68 on his eight-acre wheat patch on land valued at \$450. That same year the Illinois man made \$145 from 27 acres of wheat on land valued at \$3,046; the Minnesotan made \$276.32 on 44 acres valued at \$2,150; the irrigationist in Wyoming or Nebraska made \$188 from 21 acres valued at \$2,100; the Nebraska—humid region—wheat farmer made \$240 on 40 acres valued at \$2,981. The Vermont man's returns are at the rate of 35 per cent of the land value."

The writer in the *Country Gentleman* might have drawn other interesting lessons from these figures. He seems to have made one or two errors inadvertently. Of course eight acres at \$50 an acre would be valued at \$400 instead of \$450. If the returns from an acre of Vermont wheat land were \$19.71 and the value of the land, \$50 an acre, then the returns would be at the rate of 39.4 per cent rather than 35 per cent. It will be seen that the returns per acre from Illinois wheat land amounted to \$5.37 and that the Vermont farmer received more from his eight acres than the Illinois grower did from his 27 acres. It will be seen that the returns per acre for Minnesota amounted to \$6.28; it will be seen that the irrigationist in Wyoming and Nebraska made \$8.95 per acre, and the wheat grower in the humid region of Nebraska, \$6 per acre. The Illinois wheat lands were valued at \$112.44 per acre and the returns were at the rate of 4.7 per cent on the land value. The value of the wheat lands of Minnesota according to these figures would be \$48.86 per acre, and the returns at the rate of 12.8 per cent of the land value. The value of wheat lands on the irrigated regions of Wyoming and Nebraska would be \$100 an acre and the returns 8.95 percent of the land value. The land in the humid region of Nebraska, according to these figures, is worth \$74.52 an acre and the returns would be slightly more than 8 per cent of the land value. Compared with the returns of nearly 40 per cent on land value shown on the Vermont wheat land one may get an idea of the productiveness of Vermont soil.

While most of the wheat grown in Vermont is spring wheat, occasionally a crop of winter wheat is grown. Recently a Woodstock farm raised three acres of winter wheat which produced an average of 43 bushels per acre. A letter from the superintendent of the Vermont State Industrial School at Vergennes states that for several years from 40 to 42 bushels of wheat per acre have

been raised on the farm owned by that institution. Last year the average yield per acre of winter wheat in the United States was 19 bushels. The greatest winter wheat growing states are Kansas, Nebraska and Missouri. Their average yields last year were: Kansas, 20.5 bushels; Nebraska, 19.3 bushels, Missouri, 17 bushels. Evidently Vermont can hold her own in wheat growing if she undertakes to raise that crop.

OATS

During the forty-year period, 1870-1909, inclusive, Vermont's average yield of bushels of oats per acre was the largest of any state in the Union. Last year only four states surpassed Vermont in the yield of bushels of oats per acre, and all these states were in the irrigated region of the West. Vermont's average yield was 42.5 bushels, while that of the United States was 29.7 bushels.

Vermont's average yield for the past two years was 40.7 bushels per acre while the average yield for the United States for the same period was 29.4 bushels per acre. Vermont's average yield for the period, 1870-1909, was 35.1 bushels per acre, while the average for the United States for the same period was 27.6 bushels per acre.

The states producing the largest number of bushels of oats in recent years are Iowa, Illinois, Minnesota, North Dakota and Wisconsin. The average yield of oats per acre in these states during the past two years was as follows: Iowa, 33.7 bushels; Illinois, 26.5 bushels; Minnesota, 32.9 bushels; North Dakota, 26.8 bushels; Wisconsin, 31.7 bushels. Not one of these states equals Vermont's average.

The average Vermont price to farmers December 1 for the two-year period 1913-1914, was 53.5 cents. The average price for the period throughout the United States was 41.5 cents. The average price per bushel during the last four years in the states producing the largest number of bushels of oats was as follows: Iowa, 37.5 cents; Illinois, 41 cents; Minnesota, 36 cents; Wisconsin, 40 cents. Vermont's price was far better than that paid by any of these states. For the forty-year period, 1870-1909, the average Vermont price was 43.5 cents per bushel, while the average price for the whole country was 32.3 cents per bushel.

In 1914 Charles G. Cady of Middlebury, raised 1901½ bushels of oats on 32½ acres, or an average of 58½ bushels per acre. The average yield per acre for the United States in 1914 was 29.6 bushels per acre.

BARLEY.

In 1914 only six states, and all of them in the irrigated regions of the Far West, raised more bushels of barley per acre than Vermont. Vermont's average for 1913 and 1914 was 33.2

bushels per acre, while the average for the United States was 24.8 bushels. The great barley growing states of the Union are California, Minnesota and North Dakota. These states produced an average yield per acre for the past two years as follows: California, 28 bushels; Minnesota, 23.5 bushels; North Dakota, 19.1 bushels. Vermont easily outranks all of these states.

Vermont's average yield of barley for the forty years from 1870 to 1909 was 27.2 bushels, and the average for the United States for that period was 23.2 bushels. During that period only four states showed a larger yield per acre than Vermont.

The average price paid farmers December 1 for the two-year period 1913-1914, was 77.5 cents per bushel in Vermont and 54 cents for the United States as a whole. The average price paid in the leading barley growing states was as follows: California, 63.5 cents; Minnesota, 50.5 cents; North Dakota, 42.5 cents. The Vermont price again exceeds not only that of the United States but also that of the states growing the largest amount of barley. The average Vermont price for the forty-year period, 1870-1909, was 69 cents per bushel, and the price for the United States for the same period was 55.1 cents per bushel.

RYE.

Last year only one state, and that state in the irrigated region of the West, raised more bushels of rye per acre than Vermont, and two states in the Far West have the same average, twenty bushels per acre. Vermont's average yield for 1913-1914 was 19 bushels per acre, and that of the United States for the same period was 16.5 bushels per acre.

The great rye growing states are Wisconsin, Minnesota, Michigan and Pennsylvania. The average yield of these states for the past few years is as follows: Wisconsin, 17 bushels; Minnesota, 18.9 bushels; Michigan, 15.1 bushels; Pennsylvania, 17.7 bushels. Vermont's average yield for the forty-year period, 1870-1909, was 15.9 bushels per acre, while the average for the United States for the same period was 14 bushels per acre. Only five states surpassed Vermont during this forty-year period in bushels of rye per acre. Vermont does not suffer by any of these comparisons.

The average price paid to Vermont farmers December 1 for the two-year period 1913-1914, was 85 cents per bushel. The average price for that period throughout the United States was 74.9 cents per bushel. The average price paid in the leading rye growing states for the period mentioned was as follows: Wisconsin, 74 cents per bushel; Minnesota, 68.5 cents per bushel; Michigan, 76.5 cents per bushel; Pennsylvania, 78.5 cents per bushel. The average price per bushel paid in Vermont for the forty-year period, 1870-1909, was 78.3 cents, and the average in the United States for the same period was 60.4 cents.

BUCKWHEAT.

In 1914 only one state surpassed Vermont in bushels of buckwheat per acre, Vermont's average yield being 28 bushels. Vermont's two-year average, 1913-1914, was 26.5 bushels per acre. The average yield for the entire country for that period was 19.2 bushels per acre. The great buckwheat growing states of the Union are Pennsylvania and New York and their average yield for the last two years was as follows: Pennsylvania, 19.5 bushels per acre; New York, 18.6 bushels per acre. Vermont's average yield for the forty-year period, 1870-1909, was 21.9 bushels, and that of the whole country was 16.5 bushels per acre. Only one state in the Union during this period surpassed Vermont in the yield per acre. The average Vermont price to farmers December 1 for the period, 1913-1914, was 81 cents per bushel and that of the entire United States was 75.9 cents per bushel. For the same period the price in Pennsylvania was 74.5 cents per bushel, and in New York the price was 78.5 cents per bushel. Vermont is entitled to a place in the first rank of states and of countries in ability to furnish the raw materials for buckwheat cakes and maple syrup with which to sweeten them.

POTATOES.

During the forty-year period, 1870-1909, only two states showed a larger average yield of bushels of potatoes per acre than Vermont. In 1914 only one state, Maine, surpassed Vermont in bushels of potatoes per acre, Vermont's average yield being 168 bushels. Vermont's average yield per acre for the two-year period, 1913-1914, was 147.5 bushels, while the average yield for the United States for the same period was 99.9 bushels.

The great potato growing states so far as aggregate amount of bushels produced is concerned, are New York, Michigan, Wisconsin and Maine, in the order named. The average yield per acre in these states for the period, 1913-1914 was as follows: New York, 109.5 bushels; Michigan, 108.5 bushels; Wisconsin, 116.5 bushels; Maine, 240 bushels. The average Vermont yield for the forty-year period, 1870-1909, was 112 bushels, and for the United States for that period was 83 bushels.

Owing partly to the utilization of the new lands of Aroostook county, and partly to scientific culture, Maine has been able to take first place in the yield of potatoes per acre, but Vermont affords wonderful opportunities for potato growing, and if the same methods are employed in Vermont that have proven so successful in Maine, there are large areas here on which equally good results may be achieved.

The fact that some of the best known varieties of potatoes bear Vermont names, like "Green Mountain" and "Pride of Vermont", indicates that this state naturally is associated with

the growing of good potatoes. The late C. G. Pringle of Charlotte, Vt., one of the most famous of American botanists, many years ago originated the Snow Flake potato. He also originated the hulless oat, which made possible the production of certain popular cereal products, and Defiance wheat, which for many years was the staple product of some of the larger wheat fields of the West. It is said that Mr. Pringle gave Luther Burbank his first impulse to originate new varieties of plants.

One of the large commercial fertilizer companies recently offered seven prizes for the largest yields of best quality, table-size potatoes. The second prize was awarded to George E. Burditt of Rochester, Vt., who raised 527.2 bushels from one acre, 73.5 per cent being of table-size, 14.9 per cent being adjudged too large, and 11.6 per cent too small. Burditt's yield was only 18.3 bushels below the yield of the Maine man who captured the first prize. Mr. Burditt is a young man, who, when he made this record was just beginning farming, and had recently completed the short course in agriculture at the University of Vermont.

A recent report of the Vermont Department of Agriculture shows that an acre of Gold Coin potatoes raised in the northern part of the state yielded 360 bushels, which sold at 50 cents per bushel. The cost of plowing, fitting the land, planting seed, fertilizer, tillage, spraying six times, digging and rent of land, amounted to \$79, leaving a net profit of \$101 for the acre of potatoes. This farmer also raises about 5,000 bushels of seed potatoes for the Virginia market.

In this connection it is interesting to note that this farmer, who is Hon. E. S. Brigham, Commissioner of Agriculture, entered upon this line of business in a way that is a compliment to himself and a credit to the state of Vermont. H. W. Collingwood, in the *Rural New Yorker*, of which he is editor, has published an illustrated article on this subject, in which he said: "You would hardly say that the man shown in the picture is making history—would say he is spraying potatoes. The fact is he was doing both. When you prove that northern Vermont has the peculiar climate and soil needed to grow superior seed potatoes you make history. It is much like proving that the Islands of the English Channel produce superior butter cows, that the shores of the Mediterranean Sea produce laying hens, or that around northern France are to be found superior draft horses.

"A few years ago a group of Southern farmers and truckers, who planted large quantities of potatoes, went hunting for strong and vital seed. There was great damage from blight, which disease was peculiarly bad in their section. * * * These planters wanted, if possible, seed from plants that never had the disease. They asked the Department of Agriculture to locate a section

where there was least potato blight. Then they wanted a farmer to try growing seed. The agent of the department suggested E. S. Brigham, who lives near St. Albans, Vermont. It cannot be said that there is no potato blight in this part of northern Vermont, but it is infrequent, and in favored localities; with proper spraying, large areas of potatoes may be developed with no trace of the disease."

The article then proceeds to describe the methods of culture, which description does not find a place properly in this book, the important fact being that the United States Department of Agriculture recognized Vermont as a region superior to all others for the raising of good seed potatoes, free from blight. This is a fact not to be ignored by farmers who are weighing the merits of various agricultural regions. Owing to climatic conditions many Southern farmers are unable to grow their own seed, and the profitable business of growing seed in Vermont may be increased largely.

The Commissioner of Agriculture provides for the inspection of seed potato stock, furnishes rules for such inspection and issues certificates of inspection to those persons whose potato fields meet the requirements established, setting forth that the crop is eligible to certification for seed purposes.

Experts have declared that the White River valley was as well adapted to potato raising as Aroostook county, Maine. The White River Railroad Company recently offered prizes for the best potatoes grown along its line, and the winner of the first prize raised 467.4 bushels from an acre. Good potato growing soil, however, is limited to no particular section of the state, and when Aroostook county methods are employed, Aroostook county yields will be secured in almost any part of Vermont.

HAY.

Vermont is a great natural hay growing state, one of the very best in the Union. The sweet rich grasses grown here give the state a great advantage as a dairy region, and the same qualities make possible large crops of a superior quality of hay. Last year Vermont ranked among the states of the Union, fifteenth in acreage of hay, sixteenth in the value of its hay crop, twentieth in total production and thirtieth in yield per acre. If the same care were taken in the cultivation of the hay crop that is given to other staple crops, in which Vermont stands in the front rank, the \$17,345,000 produced last year from Vermont meadows, might be nearly, if not quite, doubled.

Vermont's average yield in 1913-1914 was 1.24 tons per acre, while the average throughout the United States for the period was 1.37 tons per acre. The great hay growing states are New York, California, Wisconsin, Iowa and Pennsylvania. The average two-year yield for these states for 1913-1914 was as



GATHERING MAPLE SAP.



BOILING MAPLE SAP.

follows: New York 1.17 tons; Iowa 1.45 tons; Pennsylvania 1.30 tons; California 1.72 tons; Wisconsin 1.68 tons. The average yield for Vermont for the forty-year period, 1870-1909, was 1.15 tons. The average yield for the United States for that period was 1.28 tons. The average Vermont price to farmers December 1 for the two-year period, 1913-1914, was \$14.55 per ton. The average price in the United States for the period was \$11.77 per ton. The average price for this period in the great hay growing states was as follows: New York \$14.75; California \$10.85; Wisconsin \$10.20; Iowa \$9.85; Pennsylvania \$16.30. The average returns per acre from hay for the United States, for the period 1870-1909, amounted to \$15.065, and for Vermont for the same period amounted to \$16.732.

According to the census reports in 1909 Vermont had 1,030,-618 acres of hay and forage and produced 1,502,730 tons valued at \$16,335,130. These figures show that in 1909 Vermont ranked as the twenty-second state in acreage, the twentieth in production and the sixteenth in value of crop.

While Vermont's average yield falls below the average yield for the United States, its average exceeds that of many of the great hay growing states. The large yield in the irrigated states of the West brings up the average for the country. The total value of hay and forage crops in Vermont in 1909 was six times the value of the cereal crops of the state, about twice that of potatoes, and represented about three-fifths of the total value of Vermont crops for that year. The hay and forage acreage in this state is nearly eight times that of the cereal acreage. The increase in acreage from 1899 to 1909 was 2.4 per cent, and the increase in value of the crop during the same period was 54.9 per cent.

Although hay is the principal Vermont crop it is possible largely to increase the yield by means of more intensive agriculture and a better system of crop rotation. Vermont can do better—much better—than she is doing now in the production of hay, and an excellent opportunity is afforded in this state for a larger production of this important crop. If mineral wealth to the value of ten million dollars were discovered in Vermont that fact would be heralded from the Atlantic seaboard to the Pacific coast, and yet an increase of ten million dollars in the value of this Vermont crop, which seems entirely possible, would be of greater permanent value to the state. If mineral wealth to that amount were extracted, nothing would be left but a hole in the ground, but a material increase in the value of one of the principal staple crops would leave the soil more fertile for the production of future crops, and therefore more valuable. Prof. L. R. Jones, now of the University of Wisconsin, has said of Vermont's opportunities along this line: "Both the climatic and the soil conditions of this section are peculiarly suited to the growth

of grass and the agricultural reputation of New England is largely based upon this fact. Nature has given a wider variety and more luxuriant growth of valuable natural grasses than in any other like area in the United States."

According to the last United States census report, 63.1 per cent of the improved land of Vermont was utilized for the cultivation of hay and forage crops, this percentage being the largest shown by any state in the Union. The average percentage for the United States was 15.1. Only eight states exceeded Vermont in the value of timothy and clover mixed, based on production, and only nine states exceeded in the amount produced. Fourteen states, according to the census figures, produced more timothy than Vermont in 1909. The United States crop statistics for 1914 showed that fourteen states in that year exceeded Vermont in acreage of hay, nineteen states surpassed Vermont in total production, fifteen states exceeded in value of the crop, while twenty-nine states showed a better average in tons per acre.

The Vermont Experiment Station sometime ago published Bulletin 171 "Concerning the Hay Crop," a 28 page pamphlet, dealing with the soil, its preparation, choice of grains and clovers, seeding for hay, reseeding meadows, weeds in meadows and the manuring of meadows. It is sent to any address without charge for the asking. Letters should be addressed to the Experiment Station, Burlington, Vt.

ALFALFA IN VERMONT.

While alfalfa has not been grown extensively in Vermont—only 252 acres were reported in 1909—it has been grown successfully in Grand Isle county, which led in the production, with Addison county a close second, and good returns are made from other portions of the state. An alfalfa expert has said that he never has seen alfalfa east of the Mississippi river superior to that in the fields of Grand Isle. A Grand Isle farmer has written the Publicity Bureau as follows regarding his experience in alfalfa growing: "I have been growing alfalfa now fifteen years, the first five years on a small scale, which was not very satisfactory, as we did not cut it early enough, or cure it properly. All agricultural papers said to cut it when it was well blossomed out, which we did, and cured it as we did our clover and other hay. We found that the leaves dropped off in handling and left a woody stalk that the cattle did not care for. We now cut it as soon as we see a blossom and let it wilt a short time, then cock it up and let it stand three or four days, then open and air it and put it in the barn. No leaves will drop and if it is good weather when put in, it will come out of the mow as green as the day it was cut. We put in about sixty-five tons last year and it averaged about

five tons to the acre, and we are seeding ten acres this year. I wish my hay was all alfalfa."

According to a newspaper account a Putney farmer succeeded in growing three and two-fifths tons of alfalfa on a measured acre of land during the season of 1914. The crop was sown in September, 1913, and fertilized with stable manure and one ton of land lime. The first cutting was made June 22 and 2,800 pounds were harvested. The second cutting was on August 17th, with a yield of 2,100 pounds and on September 22nd a third cutting was made of 1,900 pounds, totaling 6,800 pounds.

TOBACCO.

While tobacco is not extensively grown in Vermont, there are tobacco farms in the southern part of the state, in the Connecticut valley, that are very productive. Last year only three states surpassed Vermont in pounds of tobacco per acre. Vermont's average for 1914 was 1,700 pounds per acre. The general average for the United States was 845.7 pounds per acre.

The great tobacco growing states of the Union are Kentucky, North Carolina and Virginia, and their average yield the past year is as follows: Kentucky, 910 pounds; North Carolina, 650 pounds; Virginia, 650 pounds. Vermont's average for the forty-year period, 1870-1909, was 1,533.7 pounds, and that of the United States for the same period was 747.6 pounds.

The average Vermont price to farmers December 1st was 18 cents per pound, and the average price for the United States was 9.8 cents per pound. The average price for the same period in the great tobacco growing states was as follows: Kentucky, 6.4 cents per pound; North Carolina, 11.5 cents per pound; Virginia, 9 cents per pound.

While Vermont's tobacco crop is not large in the aggregate, this crop record affords another excellent illustration of the fertility of Vermont soil, and it is probable that the tobacco output of the state could be increased considerably.

MAPLE SUGAR.

No state in the Union is associated so distinctly with the production of high grade maple sugar as is Vermont. Probably the majority of the American people involuntarily think of Vermont when maple sugar is mentioned. Of course the Green Mountain state does not produce all the maple products, but for many years it has led all states in the production of maple sugar, although one or two other states have led in the production of maple syrup.

Of the 18,899,533 maple trees tapped in the United States in 1909, 5,585,632, or nearly one-third, were reported from Vermont. According to the last census report Vermont made

7,726,817 pounds of maple sugar and 409,953 gallons of maple syrup, in 1909. Vermont produced that year more than half the 14,060,206 pounds of maple sugar made in the entire country, and ranked third in the production of maple syrup. In 1909 Vermont showed an average income from maple products of \$108 per farm, compared with an average income of \$59 per farm for the United States, Vermont's average being the largest of any state in the Union.

According to the census report, Vermont and New York produced over 77 per cent of the total crop in 1910, over 70 per cent in 1900, over 74 per cent in 1890, over 60 per cent in 1880, and these two states, together with Pennsylvania, Ohio, New Hampshire, Maryland, and Michigan, have produced over 90 per cent of the total maple sugar crop since 1880. The money value of Vermont's production of maple sugar and syrup in 1910 was \$1,086,933, according to the last census report.

It is certain that Vermont might increase largely the output of maple products, but owing to the high price of maple wood not a few orchards have been cut down and sold as timber, a process comparable to that of killing the goose that laid the golden egg. The Legislature of 1912 passed an act requiring the listers in each town to obtain statistics regarding the number of maple trees tapped, the number of maple trees available and not tapped, the number of pounds of maple sugar and gallons of maple syrup made. The following figures showing the returns from various towns, arranged alphabetically by counties, are taken from the annual report of the State Commissioner of Agriculture for 1914:

ADDISON COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Addison	1,945	1,515	860	430
Bridport	4,625	505	50	225
Bristol	10,060	11,935	27,240	450
Cornwall	9,290	2,990	520	615
Ferrisburg	1,200	50		
Goshen	4,280	5,700	6,700	504
Granville	30,100	16,500	30,410	1,000
Hancock	7,600	9,612	26,100	165
Leicester	5,800	1,275	2,350	115
Lincoln	26,235	51,329	82,640	2,630
Middlebury	4,835	11,595	8,870	220
Monkton	3,550	4,425	6,637	947
New Haven	7,800	2,900	8,150	590
Orwell	11,369	6,875	2,850	2,343
Panton	1,583	161	230	40

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Ripton	8,400	3,600	2,800	1,075
Salisbury	5,690	3,950	1,535	640
Shoreham	7,850	2,955	380	619
Starksboro	36,900	67,635	87,200	7,749
Vergennes	210			
Waltham	1,500			
Weybridge	9,320	4,180	4,375	985
Whiting	1,725	675	300	145

BENNINGTON COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Arlington	6,695	5,430	570	1,030
Bennington	2,320	1,847	90	290
Dorset	18,195	21,759	1,560	6,402
Glastenbury	712	1,382	140	150
Landgrove	8,320	6,480	845	1,240
Manchester	21,990	15,841	680	2,705
Peru	130,470	10,183	1,125	1,574
Pownal	4,615	5,645	685	1,298
Readsboro				
Rupert	22,990	25,010	3,090	7,510
Sandgate	10,345	10,656	335	3,328
Searsburg	8,700	1,460		700
Shaftsbury	5,721	1,463	780	386
Stamford	5,535	1,300	20	301½
Sunderland				
Winhall	14,175	15,465	12,560	2,620
Woodford				

CALEDONIA COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Barnet	47,520	26,750	57,890	1,002
Burke	7,600	36,300	50,080	1,470
Danville	51,665	37,591	67,355	540
Groton	9,300	11,275	30,175	196
Hardwick	30,225	53,175	93,765	1,264
Kirby	21,775	25,450	35,550	1,852
Lyndon	50,770	68,835	115,900	1,229
Newark	9,080	12,600	39,420	90
Peacham	29,905	39,197	65,000	1,282
Ryegate	26,400	22,970	31,420	996
Sheffield	45,415	35,700	60,650	200

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
St. Johnsbury	24,171	27,325	36,791	2,743
Stannard	9,050	16,150	34,400	21
Sutton	28,420	59,407	102,550	62
Walden	31,850	34,130	54,997	205
Waterford	23,900	21,750	32,050	277
Wheelock	95,250	32,500	53,050	.

CHITTENDEN COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Bolton	4,380	6,050	750	1,957
Burlington				
Charlotte	7,880	5,746	5,206	725
Colchester	7,400	2,650	400	569
Essex	11,100	23,218	13,320	5,961
Hinesburg	25,930	24,585	27,188	2,958
Huntington	25,810	28,760	32,860	4,073
Jericho	22,749	37,557	37,105	9,755
Milton	15,235	24,150	12,800	6,270
Richmond	21,700	13,200	14,800	1,385
Shelburne	11,100	1,950	1,015	225
So. Burlington	974	102	18	60
St. George	1,100	50	150	
Underhill	45,225	52,335	73,980	6,305
Westford	39,700	67,030	56,540	7,727
Williston	17,780	7,390	1,400	1,577

ESSEX COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Bloomfield				
Brighton	8,625	8,285	12,650	295
Brunswick	2,800	1,600	3,200	
Canaan	13,475	11,010	15,200	364
Concord	10,725	15,015	15,800	890
East Haven	4,800	7,350	10,385	34
Granby	2,850	5,415	4,125	525
Guildhall	9,300	9,860	8,600	955
Lemington	8,100	3,600	5,200	200
Lunenburg	10,000	32,000	15,000	6,000
Maidstone	12,000	5,500	5,000	625
Norton	4,300	1,250	1,350	20
Victory	3,725	1,200		

FRANKLIN COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Bakersfield	31,025	63,923	123,162	1,403
Berkshire	39,743	73,663	111,975	5,999
Enosburg	19,500	73,965	165,670	2,565
Fairfax	18,200	57,055	33,100	8,225
Fairfield	67,175	140,930	145,860	23,320
Fletcher	34,751	79,151	119,608	6,190
Franklin	17,210	52,145	63,700	13,015
Georgia	24,845	11,330	9,160	2,695
Highgate	11,948	9,319	3,388	1,032
Montgomery	79,500	89,005	178,700	6,730
Richford	16,055	58,153	106,915	3,135
Sheldon	10,000	31,650	48,400	3,950
St. Albans City				
St. Albans Town	4,300	5,750	1,175	375
Swanton	2,927	3,690	6,601	300

GRAND ISLE COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Alburg	2,956	990	450	75
Grand Isle	1,800			
Isle La Motte	3,500			
North Hero	1,350	500	90	80
South Hero		600	1,000	25

LAMOILLE COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Belvidere	17,700	15,510	34,350	133
Cambridge	48,200	88,500	214,900	1,046
Eden	27,760	37,155	63,150	
Elmore	12,700	18,250	30,000	950
Hyde Park	17,300	38,845	46,300	3,323
Johnson	28,715	66,803	123,940	4,675
Morristown	29,150	44,725	38,105	4,952
Stowe	71,060	63,025	89,450	1,825
Waterville	95,400	44,110	93,700	975
Wolcott	28,455	41,245	11,775	487

ORANGE COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Bradford	12,365	10,065	20,400	300
Braintree	19,770	18,852	4,650	4,567
Brookfield	46,550	14,200	13,510	1,986
Chelsea	38,465	26,300	39,150	323
Corinth	46,690	44,137	100,350	125
Fairlee	2,500	1,625	3,320	30
Newbury	37,025	34,095	35,375	3,345
Orange	15,195	14,592	11,380	193
Randolph	41,040	28,830	15,100	2,840
Strafford	30,150	23,150	35,200	957
Thetford	27,918	13,667	5,675	1,855
Topsham	69,289	29,604	56,968	717
Tunbridge	72,375	48,465	50,670	2,620
Vershire				
Washington	62,610	18,245	18,550	1,378
West Fairlee	4,400	4,500	12,100	100
Williamstown	51,950	16,650	34,975	150

ORLEANS COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Albany	19,720	134,288	200,100	
Barton	25,000	60,000	180,000	1,200
Brownington	14,015	47,125	68,500	260
Charleston	124,890	71,533	152,305	170
Coventry	8,175	31,955	40,800	
Craftsbury	58,875	59,330	112,300	900
Derby	49,750	94,575	167,550	998
Glover	37,835	88,215	183,150	300
Greensboro	51,525	95,185	235,850	834
Holland	16,485	57,632	109,400	146
Irasburg	53,580	77,937	151,179	630
Jay	23,100	26,225	47,150	95
Lowell	30,525	39,340	65,140	356
Morgan	30,785	55,866	108,100	110
Newport	24,140	39,855	78,230	1,027
Troy	25,721	36,290	66,500	265
Westfield	11,450	28,060	50,600	
Westmore				

RUTLAND COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Benson	10,877	7,240	775	1,860
Brandon	3,985	1,050	1,400	128
Castleton	3,190	3,540	454	1,110
Chittenden	12,400	9,001	8,332	2,145
Clarendon	19,220	14,340	13,200	4,350
Danby	38,990	53,497	7,110	14,300
Fair Haven	1,295			
Hubbardton	11,450	4,750	2,095	1,668
Ira	7,175	4,860	1,750	1,090
Mendon	3,200	3,650	3,750	
Middletown Springs	14,000	14,500	200	5,300
Mount Holly	9,700	11,823	12,297	1,268
Mount Tabor	3,000	3,275		1,415
Pawlet	9,374	15,450	2,350	6,056
Pittsfield	10,300	12,250	24,750	200
Pittsford	5,045	3,590	640	795
Poultney	5,684	3,885	1,430	470
Proctor	500	450		60
Rutland City				
Rutland Town	4,125	3,150	1,952	1,169
Sherburne	4,450	7,175	9,885	1,625
Shrewsbury	18,915	29,395	17,950	7,141
Sudbury	4,902	3,398	1,455	861
Tinmouth	29,550	15,170	1,900	3,380
Wallingford	15,915	16,050	2,050	4,415
Wells	5,335	3,055	1,200	611
West Haven	6,775	3,020	575	800
West Rutland	1,822	1,580	520	385

WASHINGTON COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Barre Town	9,835	12,700	17,225	1,557
Barre City	1,300	300	750	40
Berlin	24,065	14,160	16,510	235
Cabot	61,755	56,110	106,525	2,111
Calais	40,000	34,810	60,925	
Duxbury	22,400	17,025	32,650	
East Montpelier	25,072	12,682	22,225	464
Fayston	21,700	21,010	18,900	1,330
Marshfield	36,955	46,900	85,950	
Middlesex	21,530	20,345	38,650	325
Montpelier	4,225	2,050	3,700	120
Moretown	25,780	24,680	33,800	448

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Northfield	31,275	15,200	12,760	820
Plainfield	13,515	14,560	26,760	75
Roxbury	23,135	10,353	9,190	840
Waitsfield	63,251	29,800	33,900	3,410
Warren				
Waterbury	11,050	28,350	52,900	350
Woodbury	18,700	12,950	22,900	
Worcester	8,690	2,115	5,575	

WINDHAM COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Athens	9,520	1,450	1,100	335
Brattleboro	14,554	7,400	13,600	2,115
Brookline	7,070	4,805	5,675	1,720
Dover	44,600	38,925	6,574	7,431
Dummerston	7,600	6,000	4,400	908
Grafton	11,255	5,065	4,220	597
Guilford	17,539	17,535	5,140	5,458
Halifax				
Jamaica	20,225	10,300	5,310	3,615
Londonderry	22,640	40,850	47,500	3,396
Marlboro	20,500	14,580	15,500	2,330
Newfane	14,150	9,350	2,270	1,990
Putney				
Rockingham	5,860	7,809	6,915	1,822
Somerset	3,500			
Stratton	7,705	2,225	1,650	356
Townshend				
Vernon	1,483	262		74
Wardsboro	30,770	22,595	6,190	3,928
Westminster				
Whitingham	48,791	35,121	275	11,236½
Wilmington	20,250	153,880	500	15,803
Windham	22,780	10,940	6,450	1,975

WINDSOR COUNTY.

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Andover	15,475	6,555	7,500	1,741
Baltimore	1,000	1,800	2,000	400
Barnard	38,340	25,102	1,310	5,213
Bethel	32,880	18,260	19,669	2,364
Bridgewater	31,000	8,600	1,600	2,200
Cavendish	20,600	10,250	15,275	2,719

Towns	Maple trees available and not tapped	Maple trees tapped	Lbs. maple sugar made	Gals. maple syrup made
Chester	21,825	12,840	14,780	1,615
Hartford	6,955	6,875	300	2,295
Hartland	2,750	10,240	805	3,000
Ludlow	15,580	8,781	21,390	590
Norwich	13,470	9,870	4,035	1,987
Plymouth	14,350	11,250	7,170	2,920
Pomfret	12,300	5,150		1,870
Reading				
Rochester	57,570	52,535	104,665	1,125
Royalton	25,310	14,925	13,350	311
Sharon	23,150	7,675	6,895	1,033
Springfield.	27,316	7,395	5,180	1,464
Stockbridge	29,700	18,360	32,000	715
Weathersfield				
Weston	16,765	19,480	5,545	2,185
West Windsor	17,465	9,920	4,450	2,430
Windsor	3,300	700	625	265
Woodstock	26,280	16,905	230	5,070

It will be noted that these tables are not altogether complete, and as they are compiled in many instances from estimates it is probable that they are not entirely free from errors.

It will be seen that only about half the available maple trees are tapped. Only a beginning has been made in the development of a market for pure high grade Vermont maple products. Vermont maple sugar and syrup already form the standard by which the quality of all maple products is judged. The possibilities of developing a vastly larger and more lucrative business in this state are very great. The sugar maple is a long lived tree. William Chapin of Middlesex, has told the story of a Vermont sugar maple 200 or 225 years old, a cross section of which disclosed tapping marks for one hundred years or more.

Maple sugar is made at a time of the year when other farm work is not pressing and it constitutes a most desirable side line for the farmer, adding materially to the farm income.

The State Publicity Department has compiled a list of more than five thousand names of persons in all parts of the country, who are interested in securing pure maple products. This list has been printed and may be obtained upon application to the Publicity Department of the Secretary of State's office. Although this list was not issued early enough last year to get the full benefit which should come in a single season, the president of the Vermont Maple Sugar Maker's association reported at the annual meeting held in January, 1915, that several thousand dollars worth of new business had been secured as a result of this publicity. A bulletin on "The History of Maple Sugar Making in Vermont" may be obtained by applying to the State Commissioner of Agriculture.

APPLES.

Of all the agricultural opportunities that Vermont affords, and they are many, the opportunity afforded the apple grower who will adopt modern, scientific methods, must be placed in the forefront. There is no better place today than Vermont in all the length and breadth of the United States, for the profitable raising of apples; and there are few, if any, as good, all things being taken into consideration.

There are at least five great and compelling reasons why Vermont is the ideal section of this country for the profitable growing of high grade apples, and these reasons are: Unsurpassed soil and climatic conditions; cheapness of good orchard land; proximity to the best markets; superior flavor of Vermont apples; excellent keeping quality of Vermont apples.

The United States census of 1910 showed 23,649 Vermont farms reporting apple trees of bearing age; 7,205 Vermont farms reporting apple trees not of bearing age; 1,180,529 apple trees of bearing age in Vermont and 219,833 apple trees not of bearing age in this state. Vermont produced in 1909 1,492,494 bushels of apples, a gain over 1899 of 301,070 bushels, or 25.3 per cent. The gain for the United States for the same period was only 1.1 per cent. Only five states exceeded Vermont in 1909 in bushels per tree of orchard fruits, Vermont's average being 1.17 bushels. Oregon's average was 0.95 bushels and that of the state of Washington 0.88 bushels.

Prof. M. B. Cummings of the University of Vermont, states the case well when he says: "Vermont is a natural apple state and lies well within the apple belt of the United States. We have a climate which is congenial to the apple. Abundant rains in most seasons, a warm summer and a winter not too severe. However, the winters are cold enough to assist in repressing insect pests and fungus diseases which are less in evidence here than elsewhere in this country. The soil is well adapted to the apple tree; generally well drained, for the most part easily tilled and seldom too scant in fertility. Granite and limestone soil prevail, and these are conceded to be congenial to apple roots. Grafted as well as native trees live a long time in our state. One may see nearly everywhere throughout the state the native trees which possess an almost indefinite span of life. These old patriarchs appear in out-of-the-way places. They have lived and apparently thrived in absolute neglect and sometimes under abusive treatment. If native, uncared for trees will bear for fifty years, what may one expect of grafted fruit grown in cultivated orchards? The few who have tried modern methods of orcharding in Vermont are satisfied with the present environmental conditions."

Not long ago *Hoar's Dairyman* contained an article regarding a peninsula in Wisconsin running out between Lake Michigan

and Green Bay, which was considered a wonderful apple growing region because it was underlaid with limestone. The article further relates an experiment performed by a Michigan apple grower who had noted the benefit which was derived from the limestone soil of this Wisconsin peninsula, and had placed a quantity of ground limestone about every apple tree in his orchard of 125 acres. When the Almighty created this portion of the world now known as Vermont he underlaid much of it with limestone rock, so that today Vermont is the leading marble producing region in the world. Therefore, Vermonters do not need to apply limestone to their soil, as this was done for them in the beginning, and the fact has much to do with the excellence of the Vermont apple.

The fact that Vermont is well watered adds to its desirability as an apple growing region. In the Yakima valley, Washington, in 1910, water was drawn five miles in barrels to irrigate orchards. Vermont is not compelled often to depend upon irrigation.

The Vermont apples are noted for their good color, freedom from blemishes, superior flavor, crisp, juicy flesh, and excellent keeping qualities. Prof. Lowell Raudenbush and others who have studied conditions say that with one or two inconsiderable exceptions no better apple ground than Vermont exists in our country.

In concluding an article on "Apples in Vermont", recently published in the *Country Gentleman*, Samuel Frazer, writing of the men now going into apple growing in this state, said: "They are prepared to utilize the forces which Nature has given them—magnificent climate, the cool fall nights which put the color on fruit. From now on we may expect that Vermont will stand out as one of the sections which will be ranked with Hood River in apple growing history."

One may purchase good apple land at almost any price he desires to pay. Probably prices are higher in Grand Isle county than in other parts of the Champlain valley and elsewhere, because of greater development, but even there they would seem absurdly cheap to the apple grower accustomed to prices of orchard land in Oregon, while upland pastures that would grow the best of apples may be purchased often for only a few dollars an acre.

NEARNESS OF MARKETS.

The nearness of the best markets may be ascertained by looking at any map of the United States. Within a radius of 500 miles from Montpelier, the capital of Vermont, situated near the centre of the state, there is an urban population exceeding 21,000,000 or at least half the urban population of the country, which was shown by the census of 1910 to be 42,623,303.

The most important railroad systems of the East compete for Vermont freight and the Champlain valley has the benefit of water transportation to New York City by way of Lake Champlain, the Champlain canal and the Hudson river.

Vermont apple lands may be divided into two sections, Champlain valley and the hill country. Possibly a third section should be added, the Connecticut valley, although many would include that in the second section named. T. L. Kinney, a well-known Vermont apple grower, says: "The Champlain valley was the first valley in the United States which ever got a reputation as a commercial section for growing apples." Lake Champlain influences the temperature of the region and makes it particularly good for apple growing.

In an editorial in the *Rural New Yorker*, discussing Vermont agricultural conditions, reference was made to a letter from Pennsylvania, which described an exhibit of Oregon apples. Continuing, the editorial said: "The exhibit referred to was 266 boxes of prize winning apples from Oregon. We have seen much the same exhibit in New York. They were remarkably fine, but there were finer apples exhibited at the Vermont Horticultural meeting at Montpelier, not only finer in appearance, but much higher in quality.

"You must remember that those Oregon apples are picked fruit—one out of 50,000. Not every apple grown in Oregon could compare with these. If you could scour Chester county, Pennsylvania, for a few boxes of the very best you could make a good showing. There are more of them in Oregon, because the growers there work together in growing, packing and selling. Those apples did not come from a dozen different orchards, all picked and packed as suited the individual owners. They were selected and packed by experts who went from farm to farm writing their names on the boxes they packed, with the same responsibility that would go with signing a check.

"Soil, climate, culture and care all go to make these apples what they are. Some of them are grown under irrigation, so the trees never suffer from lack of moisture. Of course, the freedom from worm holes proves that the trees were sprayed with arsenic to kill the worms. The clear skin is partly due to the clear air where these apples are grown, and to the spraying with Bordeaux. Some of this fruit was kept "copper plated" through the season. We are finding out more and more each year that certain spots or tracts of land scattered through the country are best adapted to growing high grade apples. The great growers along the Rhine in Germany, know that certain varieties of grapes will do best on certain small spots of land. By knowing this they grow wonderful crops. It is much the same with apples. The Pacific coast growers have learned where these beauties will grow, and the knowledge has not only given

them their market, but advertised their state. They have not been bashful about presenting their opportunities.

"But Vermont has been bashful. She has in the Champlain valley and other sections the soil for growing the trees and the clear, pure air for ripening and coloring the fruit. There can be no argument over the fact that just as handsome apples can be grown in Vermont as were ever grown in Oregon, and while just as high colored and shapely they will be as full of flavor and fragrance as spice. Remember, too, that while these Oregon apples must be shipped thousands of miles to market, those from Vermont are within a few hundred."

The following article has been prepared for this book by a well known apple grower of the Champlain valley, Arthur H. Hill of Isle LaMotte.

VERMONT APPLES AND APPLES FOR VERMONT.

"In the extreme northwest corner of Vermont, on Isle La Motte, apples have been grown on a commercial scale for 100 years. Fameuse, Rhode Island Greenings, Gilliflowers, Pomme de Fer or Roseau, both the Golden and Roxbury Russets, Talman Sweets and Esopus Spitzenberg were among the earlier grafted varieties grown. Most of these were sold in Canada, mostly in Montreal, from boats or bateaux, which came up here each fall after apples. Most of these varieties are still largely grown here although the Russets have been largely grafted over to other varieties more in demand and more salable.

"In later years, about 1843, apples were shipped by boat through the canal to New York and the New York buyers began to come up here for apples more than fifty years ago. The Fameuse, Rhode Island Greenings and Spitzenbergs were the desired varieties that brought buyers up into this section, and they have been coming here ever since. All of the early shipments from this section to New York were made mostly in old flour barrels until an old flour barrel became almost a trade mark on the New York market among the buyers for Vermont apples. And even to this day it is so recognized and Vermont apples properly packed in old flour barrels will command a premium of 50 cents a barrel above the market.

"The big fruit dealers there will bear me out in the assertion that Vermont apples properly packed in old flour barrels will bring more money, pound for pound, than they would in boxes. Now, this is going to arouse lots of discussion and opposition among some of the less informed fruit growers who have been telling us to pack our apples in boxes. They do not know that some of the largest apple dealers in New York find it profitable to repack Western box apples into barrels, throwing away the wrapping papers and boxes. I have known for the past six or eight years that this was being done. It will be done again



A VERMONT APPLE ORCHARD IN BLOOM.



**A VERMONT RASPBERRY FIELD.
Two Years From Planting.**

this winter because the Western apple has not the fine flavor of the Vermont grown fruit, and a certain class of trade is willing to pay a premium for the Vermont grown fruit. Possibly the recently enacted apple packing law of New York state may put an end to this practice, to the eventual benefit of the Vermont fruit grower. We have much to learn from the Western fruit grower in the way of tillage, irrigation, spraying and careful crating of our fruit, but one or two years spent in the New York apple markets will show us what is necessary to maintain our prestige. Even this past October, while nice Western Spitzenbergs were selling on Erie dock, New York City, at \$1 per box, barely enough to pay the freight, nice Vermont Greenings and McIntosh Reds in flour barrels brought \$3.75 and \$4.50 per barrel in car lots. The boxed fruit did not pay the Western grower enough to pay the freight and commission. His freight alone was \$1 per box. The Vermont grower received, after paying 27½ cents per barrel freight, and five per cent commission, better than \$3 per barrel net. The past season (1914) was not a favorable one either, for the Vermont fruit growers.

"The buyers who came up into Grand Isle county would not offer more than \$1.50 to \$1.75 per barrel for No. 1 apples. A few of the smaller lots were sold at those prices but the bulk of the crop, 16,000 barrels, was consigned to be sold on commission, and brought all the way from \$2 to \$4.50 per barrel, according to kind and quality. Let me say right here that these 16,000 barrels of apples were all grown by sixteen fruit growers who carefully sprayed their orchards last spring. The worms ate all the apples and nearly ate the trees in the unsprayed orchards. These 16,000 barrels of apples grew on less than 160 acres of land and netted the growers around \$32,000. Now any one of these growers might have owned the 160 acres of orchard if twenty odd years ago he had set out his whole farm to fruit trees instead of only five or ten or twenty acres. There are thousands of acres here, just as good orchard land to be had at \$50 per acre, and while most of these farmers paid \$25 to \$40 per hundred for these trees to some persuasive apple tree agent, just as good trees can be had now at \$10 per hundred such as I am offered by one of the large and old established nurseries, first class two-year old trees, 11-16 of an inch in diameter, 5 to 7 feet high, guaranteed true to name and free from disease, official certificate of inspection and fumigation accompanying each shipment. This is cheaper than we farmers can grow them.

"Here, then, in Vermont is the orchard land at \$50 per acre; \$10 more per acre will buy the trees and set them out, and the young man willing to work—where is he? Would an income of \$32,000 net in an off apple year from 160 acres be any inducement? Could you work and wait twenty years for your trees to produce this income? Meanwhile you could grow corn and beans

and potatoes and clover and buckwheat and possibly a crop of oats among those trees each year for ten years, and add to the health and growth of the trees by rotation of the above crops. After the fifth year the trees themselves would begin to bear, and in ten years should be producing fifty barrels of apples at least per acre. Don't try, however, to pasture cows in your orchard.

"What kind of apples shall you set? Every grower is confronted with this question. No two fruit growers, probably, will agree as to the best varieties to plant. A recent inquiry by the United States Bureau of Crop Estimates shows that more than two hundred varieties of apples are grown in the leading apple producing states. Of these varieties the Baldwin leads with a percentage of 13.4; Ben Davis, 13.3; Northern Spy, 6.1; Winesap, 5.1, of all varieties grown in the entire United States. Of course, these averages vary in the different states. Here in Vermont the Baldwin leads with an average of 15.1; Rhode Island Greening is next with 12.8 per cent average; Northern Spy, 12 per cent; Fameuse (Snow) 8.1 per cent; McIntosh Reds 6.1 per cent; Ben Davis 5.6 per cent; yellow Bellflower, 4.2 per cent. Now, the other 51.3 per cent of the apples grown in Vermont comprises over 150 different varieties, no one of which is reported to have so large a crop as any of those listed above. Farmers' Bulletin 641 will give you a list complete for the various states. Now, comparing these figures there is no other state which grows Fameuse (Snow) to the extent that Vermont grows them, and only Wisconsin approaches us in the percentage of Fameuse grown. No other state approaches us in the percentage of McIntosh grown. Here there are two varieties on which we have no competition whatever with the other apple growing states. New York produce 1.6 per cent of McIntosh; 2.4 per cent of Fameuse; 31.3 per cent of Baldwins; 14.8 per cent of Rhode Island Greenings; 13.1 per cent of Northern Spies.

"Surely when buyers come up into Vermont after apples they are looking after the varieties of Fameuse and McIntosh grown here in larger proportions than anywhere else in the United States. Don't you think it would be wise to reduce the competition on some of the other varieties and produce more of the varieties that have made Vermont apples famous? Every fruit grower has too many kinds unknown and uncalled for on the markets. Stick to the kind we can grow better than any other state. Stick to one or two varieties even though they are Baldwin and Ben Davis. The expert grower will get more money out of his Fameuse and Northern Spies or McIntosh Reds and Spitzenbergs. The only green apple worth growing in Vermont is the Rhode Island Greening. Let the Western grower experiment with new varieties. It has taken us one hundred years to establish a market for ours."

A letter from Amos J. Eaton of South Royalton, gives an idea of the possibilities of fruit growing in the upland regions of Vermont. Mr. Eaton says: "I am more strongly impressed each year with the great possibilities along the line of apple growing here in the mountain sections of our state. I began planting fruit trees in 1901. The first block contained twenty-five Northern Spy trees and we have just harvested our first crop from those trees. They gave us something over one barrel to the tree. These apples have sold for \$2.50 per barrel here in spite of prevailing low prices. Some of them have been shipped to points in Canada, North Carolina, South Carolina, New York City, New York state, Massachusetts and Quebec, always giving entire satisfaction. A portion of these apples have been kept in bushel boxes, selling at \$1 per box f. o. b. South Royalton. These apples graded as high as 95 per cent No. 1, that is the entire crop on those trees graded 95 per cent No. 1. It cost ten cents per barrel to pick and about 15 cents to pack, and 25 cents for the barrel. This leaves us a net of \$2 per barrel or per tree. They run forty trees per acre, thus making a net income of \$80 per acre for this first crop.

"We have 120 cherry trees per acre planted as fillers between these Northern Spy trees, and from these cherries we harvested last season one-half bushel to the tree or sixty bushels per acre, selling for \$240. Of this amount it cost about \$40 to pick and market, leaving us net income of \$200 per acre for cherries, and a total of \$280 per acre from this orchard. From this amount must be deducted the cost of cultivation, fertilizer, spraying, and general care of the orchard, which will amount to something like \$50 per acre, leaving a net profit of a trifle over \$200 per acre. For the annual average it would be safe to divide this sum by two, as we had neither cherries nor apples in 1913.

"I would not advise many people to plant cherries for fillers. Wealthy, Ben Davis, McIntosh or some other early bearing variety of apples will do better in most cases and give good returns. The figures I have given you are the beginning. What the final limit may be, can be suggested by the crops that I have harvested from a single Spy tree, apparently about fifty years old. During the past three seasons I have picked twenty-three barrels from this tree, which have sold for about \$60, or about \$20 per year. Allowing forty such trees per acre, would give a gross income of \$800 per acre annually. While this amount is unusual, it certainly is not impossible.

"In October I shipped a mixed car of fall apples to Cincinnati, Ohio. The big red apples—Wolf River, Alexander, Baxter, Twenty-Ounce brought satisfactory prices, but the smaller green varieties did not sell as well. At that time there was almost no market at all for that class of apples here in the East. It follows that there is always a place somewhere that apples are wanted

if the growers can be put in touch with the actual conditions. I do not know how the parties to whom I shipped learned my address, but I surmise it may have been through your office. I would suggest that a reciprocal publicity department between the several states might be of mutual benefit to both buyers and sellers, and further that a certified list of supposedly reliable dealers in various lines in the several states might also be beneficial.

"A state law requiring a uniform package and a standard grading would be of great value eventually, although such a law would be hard to enforce and unpopular at the present time. It is impossible at this time to buy a carload of apples in this section with the barrels of uniform size and the contents of uniform grade. This is true of many parts of the state. Thousands of barrels of apples were allowed to rot on the ground throughout southern Vermont and New Hampshire this season because people did not know how to handle them or where to ship them. At the same time the inferior Western apples are being shipped into almost every large town in New England. If the best of our Eastern apples could be as carefully graded and packed and as fully guaranteed as these Western apples are, they would displace the sale of Western stock in a very short time. We have good soil and climate but for successful apple growing we must have three things—expert growing, expert packing and expert selling."

VERMONT'S TRANSPORTATION ADVANTAGES.

Another successful grower of apples in the upland region of Vermont is Julian A. Dimock of East Corinth. He says: "I have planted a young orchard, renovated an old one, pursued a local market for my apples, advertised for foreign ones, and sold apples by the carload and by the single box. This year we have made direct express shipments to the consumer in Ireland, in Alabama, Arkansas, Philadelphia, New York, Boston, etc. We captured a blue ribbon for our boxes at the New England Fruit Show. I am an enthusiast in the opportunities in Vermont for apple culture but a pessimist on the use which is being made of them.

"The Boston & Maine has just supplied me with the following rates on apples: From Portland, Oregon, in carload lots to Boston, \$1 per hundred pounds; from St. Albans, Vt. to Boston, in carload lots, twenty cents per hundred pounds. The express rate from South Ryegate to Boston is 84 cents per hundred pounds; the express rate from Portland, Ore. to Boston is \$7.65 per 100 pounds. That is, I can deliver my apples by the single box at the house of the consumer or retail grocer in Boston by express at considerably less than the Oregon man can land his in carload lots by freight at the station.

OREGON GROWER OF APPLES has the advantage in

Appearance of fruit,
Packing of fruit,
Organization of growers,
Organization of distributors.

VERMONT GROWER OF APPLES has the advantage in

Flavor of fruit,
Time en route, 10 to 1.
Freight rates, 5 to 1.
Express rates, 9 to 1.
Price of land.

"Oregon is handicapped by barriers which she can never overcome. Vermont is handicapped by lack of cooperation and plain business-sense, obstacles which she should overcome within a single score of years. Her farmers will not see that the golden harvest which Oregon has reaped through modern methods of fruit raising should have been theirs, and can be if they will ever learn the lesson so plainly taught. With a home market surrounding them, the markets of the country within a day's journey of them, and the ports of the Atlantic almost within sight, they have let the energetic Westerners steal their birthright. If the demand for apples keeps pace with the supply, Vermont growers should profit because of nearness of markets and quality of fruit. If the supply overruns the demand, then Vermont should be able to supply the markets of this country and abroad, because her freight rates will be less. She wins, heads or tails.

"It takes more nerve to start in Vermont than it does in Oregon, because one is more nearly a pioneer. But one will reap the profit of 'being in on the ground floor', for the day will surely come when there will be combination and organization among fruit growers in the East."

Elmer L. Wright, Manager of Prospect Farm, Weybridge, a large grower of apples, writes: "Apple growing has been a hobby of mine for the past ten years, though I have been unable to do but little at it because of other branches of farm work. However, I have some ideas along the line which, I believe, if carried out would make apple growing here in Vermont highly remunerative, for we have the ideal soil and climatic conditions for a very few varieties which happen to be the 'best sellers' on our Eastern markets, namely, Rhode Island Greenings, McIntosh Reds, Fameuse, Spitzenbergs, Wealthies and Northern Spies. The Greening, the McIntosh and the Spy I believe to be the best money crop year in and year out, and the best quality except the Spitzenberg, that is equal in quality but not so remunerative.

"We have some locations and soils here that will produce just as nice fruit as that of the Northwest, if properly cared for, and far superior in flavor and texture. Addison county Spies are sold in the New York markets for over \$12 per barrel, and Greenings for over \$6. This fancy stock can be produced for \$2 per barrel or less, taking into account all costs such as interest on investment, depreciation of orchard value, cultivation, fertilization, spraying, pruning, harvesting, etc. The cost of carrying such fruit in cold storage will total about \$1.50 more per barrel. This cost covers freight, icing, cars, repacking, resales, commission, cartage and papers used in packing furnished by the company or purchased by the owner.

"I don't want you to understand I am now producing fancy fruit selling at that price, though our fruit some years has reached these figures. However, if one was able to devote one's time to the work it could be done easily. We harvested an eight hundred barrel crop this year at a cost for picking of 12 cents; packing, 10 cents; paper, head linen, nails, etc. 3 cents; heading 5 cents; hauling to town 5 cents, and barrels 25 cents, or 60 cents per barrel. The work was partly done by the piece and next year it will all be piece work. We have worked out a system that is much more satisfactory than hiring by the day.

"The decline of many old orchards in Vermont is due to various causes, chief among them being that they cease to be a paying proposition, and probably never did pay one-half as much as their owners thought they did, as they kept little check on their business. Most of the owners realized this too late. The reason for their not being more productive of money was because they had too many varieties and many of them were poor sellers. Much has been laid at the door of the buyer that ought never to have been put down as his crime, but charged up against the man who planted the trees. That is even true today of many planters and the day is not far distant when they will wake up to the fact.

"An orchard of McIntosh Reds, Rhode Island Greenings and Northern Spies of about equal numbers, is my idea of a practical orchard proposition. This would enable the owner to get his men at an early date and hold them to the end of the season, picking first the McIntosh Reds, then the Rhode Island Greenings, then the Northern Spies. There is absolutely no danger of over production of these varieties.

"I have found it absolutely necessary to spray thoroughly, and it is equally important to prune thoroughly, and one can do a lot of damage doing both as I have found out. Good land for orcharding can be purchased here for \$15 per acre up, depending on location in regard to highways, nearness to town, church and school."

SOME NEW APPLE ORCHARDS.

A letter from R. R. MacRae, who has set out an orchard of more than twelve thousand trees at Castleton, gives the following information: "I have planted my apple orchard at Castleton as follows: McIntosh, 5,400; Greenings, 3,000; Wolf Rivers and Alexanders, 1,000; Staymen's, 2,000; Northern Spies, 600; and a few each of about twenty varieties. These were one year whips planted April, 1913.

"B. C. Buxton set out at Middletown Springs, April, 1914, as follows, all whips: Northern Spy, 4,000; McIntosh, 3,000; Rhode Island Greenings, 2,500; Spitzenberg, 500; Alexanders, 1,000. In April, 1915, he planted additionally 3,000 McIntosh, 2,000 Spies, 1,500 Greenings, 500 Winter Bananas. All holes were dynamited for both orchards.

"I firmly believe that Vermont is especially adapted for certain varieties of apples and that we can put on the market fully as attractive fruit as now occupy all fruit stands—this fruit coming from the West. I spent many years of my earlier days in the fruit business in this locality, later in the fruit business in the state of Washington—had a young orchard of 2,000 trees in Illinois, but conditions in Vermont beat them all. The whole secret is in knowing your trees and knowing how to treat them. Constant attention is demanded, thorough spraying from four to seven times a season, intelligent pruning, cultivation, and a careful handling of the fruit after picking, as well as conscientious sizing, grading and packing. Attractive fruit in attractive packages will put Vermont apples in first place in the markets."

One of the great orchards planted in this part of the country is that owned by Edward H. Everett at Bennington. The manager of Mr. Everett's orchards writes: "As to apple growing in Vermont I do not believe that there is to be found a better state for growing apples of quality. Our apples this season will equal any apples from the Northwest country for color and will far excel them for flavor and general qualities. Vermont has the cheapest good apple land in the United States and its seasons are particularly favorable to good apple growing. Nearness to market is one thing in which the West cannot compete with us. Insect pests are no worse than in any other states East or West.

"The Orchards owned by Mr. Everett at Bennington, Vermont, contain about 35,000 trees, which are divided about as follows: 2,000 cherry (sour types); 7,000 pears, Keiffer, Duchess, Clapps and Bartletts; 6,000 plums; and 20,000 apples. These are—5,000 Baldwins; 5,000 Greenings; 2,000 Spies; 2,000 McIntosh; balance, Twenty Ounce, G. Golden, Yellow Transparent, Gano, Wealthy, Sutton and Wolf River. We raised 18,000 bushels of potatoes between our trees last season." The Everett, McRae and Buxton orchards are said to be the three largest in New England.

Ernest H. West, an enterprising Dorset apple grower, writes: "I have taken in many horticultural shows and have been impressed with the fact that we can raise better Spies and McIntosh Reds in Vermont than is possible in any other locality, while we can equal anyone in Rhode Island Greenings. This means a lot, for the two former varieties are about the greatest apples grown anywhere. Every one who has scientifically renovated an old Vermont orchard, and given it good treatment thereafter, has been amazed at the quality and quantity of fruit produced. I have an old orchard that is now producing extra fancy fruit. The hill farms of Vermont often offer wonderful opportunities for apple growing. We can get natural wind breaks and such good air drainage that in my opinion the lake region is but very little superior. Some of the new plantings will make Vermont famous, for the most modern scientific methods are being adopted."

George W. Perry of Chester, is one of the most enthusiastic believers in Vermont's possibilities as an apple growing region. He says: "There is no question but that some portions of Vermont surpass any place in the country for apple growing. The soil and climate are unequalled anywhere else. Vermont apples have a flavor beyond all others, and keep longer than those grown in the rest of New England or anywhere else. I am speaking of apples adapted to our location and climate, like the Spitzenberg, Northern Spy, McIntosh, the Fameuse and Rhode Island Greening."

In some portions of the state apples that are not suitable to be classed among the better grades are used for the manufacture of apple jelly. D. B. Dwinell of East Calais, has made successful experiments along this line, using both sweet and sour apples.

PROFIT IN UPLAND ORCHARDS.

The Champlain valley is not the only part of Vermont in which good apples may be grown profitably, as has been shown already. H. B. Collingwood, the Editor of the *Rural New Yorker*, says: "If I were a younger man today I would willingly invest every dollar and dime I could get in tilled land in New England and plant it to an apple orchard. There will be an enormous market for the fruit. These hillsides of Vermont and New Hampshire are the best places for fruit. It needs good, steep drainage. The cold air moving down and the warm air rising gives great protection from frosts."

Prof. William Stuart, formerly of the University of Vermont, has said: "There is in Vermont today much hill-town land having a valuation of from five to ten dollars per acre, which is now devoted to pasture or is largely waste land, hardly yielding sufficient revenue to pay the taxes, which, if devoted to apple orcharding, might be made to return an average income of from

fifty to one hundred and fifty dollars per acre, or even more. From having a valuation of from five to ten dollars per acre, it might have one of five hundred dollars or more if it was covered with thrifty, well-cared for apple trees. * * * There is no reason why hill-town orcharding may not be successfully and profitably practiced in Vermont."

G. H. Terrill has declared concerning Vermont apples that "the higher up on our hillsides, the better the keeping qualities. I believe there is nothing we can plant these high hills to that will produce better returns than the good red apple."

AN OREGON OPINION OF VERMONT.

An Oregon fruit grower, writing in the *New England Farmer*, said: "We have no hesitancy in saying that better flavored fruit can be produced in sections with winters like Vermont than in sections like Oregon and Washington, where the winters are mild. The cold acts upon the tree as it does upon the human system, tending to invigorate the tree in every way destroying the fungi and larvae which are injurious to the tree. It is a fact, though generally unknown in the East, that more fungi and insect pests are found in the orchards on the Pacific coast than in the East. There are many advertising pamphlets circulating in the East, picturing wonderful opportunities in the West, but if as much pains were taken to study and advertise the resources of the East they would present opportunities equal to those in the West.

"Good bearing orchards range in price from \$1,000 to \$3,000 per acre in Washington and Oregon, but this price does not include buildings. Irrigation is a necessary and expensive problem to be considered. What in the West would buy only one or two acres will purchase in the East an average size farm with buildings where irrigation is unnecessary. We firmly believe that an acre in the East can be made to clear as great profit as an acre in the West by applying Western principles to fruit growing. It is the Easterners that are making Oregon what it is. Why do they not put forth this effort to develop their native states where everything is in favor of fruit culture? With climate and soil adapted to fruit raising, varieties like Rhode Island Greenings, Baldwins and Northern Spies, large markets close at hand and extreme low price of land, the East offers an exceptional field for scientific fruit culture."

NO DANGER OF OVER-PRODUCTION.

But somebody will ask: "Is there not danger of overdoing the apple business?" In answer to this question it is proper to say that the census figures show that in the period, 1899 to 1909, the apple production of this country decreased from 175,397,600

bushels in 1899 to 147,522,318 bushels in 1909, or a falling of 27,875,282 bushels, or 15.8 per cent during the decade mentioned. During the same decade it is shown that apple trees of bearing age had decreased from 201,794,000 in 1900 to 151,323,000 in 1910, a loss of 50,471,000 trees, or 25 per cent. During that period the population of this country increased from 75,994,575 in 1900, to 91,972,266 in 1910, a gain of 15,947,691, or 20.9 per cent. Taking into account the decrease in apples and apple trees, the increase in population, the rise of the important apple canning industry during the past few years, and the possibility with a better system of distribution of food products of vastly increasing the market for fruit, it will be seen that there is no occasion to worry over a glut in the apple market for a considerable period of time.

The Vermont Legislature of 1912 passed a law exempting orchard trees from taxation for fifteen years from the time of planting, so that land devoted to orchard purposes shall be taxed for the period mentioned at the same rate assessed before the trees were set out.

In 1909 Vermont ranked twenty-fifth among the apple producing states, the reported yield for the year being 1,459,689 bushels. According to the United States Crop Report, the production in Vermont for 1914 was 3,200,000 bushels of apples, giving Vermont a rank of twenty-second in matter of production among the states in the Union.

At the New England Fruit Show, held in Boston in 1915, Vermont had a separate exhibit for the first time and won more prizes than any other State in comparison with the number of exhibits.

Vermont growers won first prizes on Delicious, Fallawater, Grimes Golden, Jacob's Sweet, Jonathan, Pound Sweet, and Winter Banana; first and fifth on McIntosh Red; first, second, and fifth on Northern Spy; first, second and third on Rhode Island Greening; first, third and fourth on Spitzenberg; first third and fourth on Hubbardston; first and third on Seek-no-further; first and third on Talman Sweet; second on Sutton, Bellflower, Lady, Opalescent, Porter, Twenty-ounce and Ben Davis; third on Roxbury Russet, Wagner and Gilliflower; fourth on Fameuse, King and Red Canada. Other prizes won were: First for best box of Grimes Golden; first for best plate of Sheldon pears; second for best plate of any other variety of pears; second for best barrel Northern Spies; second for most tastefully arranged hamper; second and third for best box of Northern Spies; second and third for best five boxes at the show; third for best box of Wealthy apples; third for best collection of six plates.

SUCCESSFUL APPLE GROWERS.

Perhaps the best known orchard in Vermont is that of C. T. Holmes of Charlotte, in the Champlain valley. This orchard, consisting of 105 acres, mostly set to Rhode Island Greenings in 1870, was in sod for many years and bore little fruit. In the winter of 1907, fifty acres of the orchard were given a good mulch of barnyard cultivation. That fall Mr. Holmes picked 2,500 barrels of apples from the fifty acres cultivated and 600 barrels from the fifty acres uncultivated. Modern methods have since been pursued in this orchard. In 1908 about \$7,000 was cleared from the orchard and in 1909 about \$12,000. In 1910 the crop sold for \$20,000, of which sum about \$15,000 was profit. The Greenings from the Holmes orchard have sold at prices ranging from five to seven dollars per barrel.

R. L. Hemenway of Bridport, in the southern part of the Champlain valley, has an orchard of thirty acres, planted between the years 1870 and 1872, which is one of the best in Vermont. Some of his best Northern Spy apples have sold in the New York markets as high as fourteen dollars a barrel. In 1910 his third grade Northern Spies sold for \$5.60 and \$6 a barrel, his fancy grade from \$6 to \$9 a barrel, and his extra fancy grade from \$9.50 to \$14 a barrel. His Greenings sold that year at prices ranging from \$5.50 to \$6.50 a barrel.

From H. B. Allen's orchard in South Hero in 1899, which was an "off" year so-called, the net income was \$1,400 from fourteen acres. The apples from this orchard sold in the New York markets at an average price of \$5.22 per barrel. Some of the best brought \$8, \$9 and \$10 per barrel. In 1910, W. N. Phelps of South Hero, sold 4,000 barrels of apples at an average price of \$3 per barrel. In 1911, F. A. Drew of South Burlington, picked a thousand barrels of apples from 550 trees, and received \$4.75 per barrel at Burlington.

Dr. H. C. Tinkham, Dean of the College of Medicine of the University of Vermont, and G. L. Pease have converted a small farm of fourteen acres just south of Burlington into a profitable investment. An old orchard has been renovated, the trees trimmed, the cavities filled with cement, the soil fertilized and cultivated, and the owners have sold in a single season \$2,000 worth of apples, also several tons of winter squash raised on the same land. In 1885 O. S. Rixford of Highgate, set out a Fameuse orchard of fifty acres on the northern slope of a stony mountain pasture. In 1906 this orchard, which has been sold since to a New York man, produced 10,000 bushels of fine fruit. Luther Putnam, owner of Westville Fruit Farm, has a fine orchard about two miles from Cambridge village, where he has conducted many experiments in fruit growing. For a number of years he had over five hundred varieties of apples and now has about forty acres planted to bearing trees, which include prac-

tically one hundred different varieties of apples. There is a large demand for this fruit from customers in large cities.

These are illustrations gathered at random with no attempt to make a thorough canvass of the state. There are many apple orchards in Vermont that may be renovated and made profitable in a comparatively short time. Why go to the Pacific coast, pay enormous prices for apple lands and be compelled to ship fruit three thousand miles across the continent, when just as good lands can be bought in Vermont at prices varying from one-fiftieth to one-twentieth of the amount asked for good apple lands in Oregon and Washington, with the best markets of the world at our very doors. The same care in cultivating, spraying, picking and packing, used in Oregon will bring just as good results in Vermont, and the advantages of the Vermont producer over his Western rival are too obvious to require any extended argument. Any person desiring to engage in apple growing will serve his own best interests by investigating conditions and opportunities in Vermont before he invests elsewhere.

Any person considering the purchase of land here for the purpose mentioned should obtain or consult a copy of a very valuable bulletin on "Vermont an Apple Growing State," issued in October, 1911, by the Vermont Department of Agriculture. It gives the varieties of apples best adapted to the various sections of the state and contains much information absolutely essential to an intelligent understanding of conditions in Vermont.

The legislature of 1915 passed a uniform apple grading law. Ungraded apples may be sold, however, without complying with the provisions of the law.

SMALL FRUITS, VEGETABLES AND NUTS.

One of the largest strawberry growing regions in Vermont is found in Bradford. There are, approximately, twenty-four growers in that town and about 125 pickers are employed during the season which lasts usually about three weeks, beginning about July first. As a rule the strawberry patches range in size from an acre or less to five acres. One of the largest growers, however, sometimes uses ten acres for raising strawberries, half of this acreage being used for bearing plants, and half for new "sets" which will come into bearing the following year.

At least two of the growers use irrigation as a protection from drouth. The number of bushels raised in a season is approximately between 4,000 and 5,000, averaging 150 to 200 bushels an acre. Practically the whole crop is sold in the two states of Vermont and New Hampshire. The early varieties are Warfield and Fountain; the late varieties are Meteor and Gibson.

The record number of quarts picked in one day stands at 335 in a little over ten hours. The largest growers often maintain camps for the pickers during the season.

In 1911 L. S. Richardson of Chester Depot, picked and sold from the rear end of a village lot, one-fourth of an acre in size, \$200 worth of strawberries. Another man realized \$275 from a half acre of strawberries, and a Hyde Park man made \$900 from two and one-half acres of land set out to strawberries. In 1908 E. H. Hallett of St. Johnsbury, raised 500 bushels of strawberries, or 16,000 quarts on one acre of land.

In 1912 George D. Aiken and George M. Darrow, the latter being connected with the Bureau of Plant Industry at Washington, D. C., purchased an old pasture in Putney which rented for \$1.00 per acre.

Since that time they have set out fifteen acres of red raspberries, one-half acre of black raspberries, four acres of blackberries, four acres of strawberries, one and one-half acres of currants and gooseberries, and one-half acre of cherries. The season begins about June 15th for strawberries and is divided as follows: Strawberries, June 15 to July 15; raspberries, July 5 to August 20; blackberries, July 25 to September 25; currants and gooseberries, June 25 to August 10; fall strawberries from August 15 until snow comes. Girls are hired to do the picking. They live in tents under the care of a chaperone, and recreation and amusements are provided for them.

A ready market is found for all fresh berries, but in order to prevent waste, berries that are too soft to ship as the result of rain, are made into jam. In 1915, more than one ton of jam was manufactured by this firm.

The first year after setting out the berries cabbages were cultivated between the rows, and the plants come into full bearing in three years.

Putney now produces more red raspberries than any other town in New England, the greater part being raised by this firm. In 1915 a two-year growth of raspberries produced a crop worth \$300 per acre, and this on land that in 1912 rented for \$1 an acre.

Writing of Vermont's opportunities as a strawberry growing state, the late L. H. Sheldon of Fair Haven, Vt., said: "The strawberry grows to perfection in our state. The long winter rest seems to be just what it needs and we do not suffer from frost oftener than in the South. In twenty years I have never grown a crop that I thought did not pay expenses; on the other hand, the best record is at the rate of over 1,000 quarts per acre. Compare our prices with what Southern growers get. Very many Southern berries were sold in our town last season for 12 cents per box. The shipper must furnish crates and boxes, pay express to New York, then to Albany, thence to Fair Haven, pay one—perhaps

two—jobbers' and one retailer's profits, to say nothing of the thousands of crates of damaged fruit being dumped in New York harbor, and the consumer at the end usually gets a basket about two-thirds full of nearly green or rotten fruit. We can grow more and finer berries per acre, cut out all those expenses, for we get the Southern man's crates for little or nothing, boxes are often returned, and our price is generally higher; and yet I know farmer boys working today in factories or mills for a pittance above their board, girls who have spent years in fitting themselves to teach in school thirty-two weeks in the year at seven dollars per week and board themselves, when they could hire the hard work done in the strawberries, and sell at wholesale, and in picking and packing they would excel."

Vegetables are raised both for the local markets and for canning factories. One St. Albans farmer raises every year about 7,000 bushels of string beans for canning, picking in the season from 500 to 600 bushels a day, and he finds it a profitable crop. Considerable sweet corn is raised in Vermont for canning purposes, and there seems to be an excellent opportunity largely to extend the canning business in this state.

D. P. Wright of Westminster, Vt. tells the Publicity Bureau that he has grown five acres of Yellow Globe onions for five consecutive years upon the same land, and plans this year to increase the area to six and one-half acres. He uses chemicals entirely as fertilizers, and has provided an irrigation system for two acres. Mr. Wright says: "The success of onions depends largely upon the crops raised on the land planted for a year or two preceding, also upon fertilizer used, condition of land, freedom from weeds, etc. Start upon a small piece. If raised upon a large scale a storehouse is of the utmost importance. If made a study, we can grow onions as well in Vermont as elsewhere."

Pears, plums and cherries grow well in Vermont and the quality produced is excellent. At a recent State Fair, G. H. Wright & Sons of Middlebury displayed thirty-four varieties of grapes. Maple Ridge Fruit Farm at Dummerston has exhibited remarkably fine peaches from a peach orchard of 1,500 trees. There is an excellent opportunity for fruit growing in Vermont. It is difficult to get raspberries, even for the home market, and it ought to be possible to grow such berries at a good profit. The parcel post system makes possible the shipping of vegetables direct to the consumer in the large cities, provided a group of customers can be secured, which ought not to be difficult.

The following letter, written to the Publicity Bureau by the late L. H. Sheldon of Fair Haven, showing how that enterprising market gardener sold his fruits and vegetables, contains suggestions that may be of benefit to many others: "Our plan of operation is to develop the local market. Our summer hotels at present use large quantities of canned goods, partly, I think, because

they are easily prepared, but it would seem to be our business to have the stuff ready for them, advertise freely so as to let their guests know that they can have fresh vegetables if they choose, and their patrons will do the rest.

"We are surprised at the amount of trade that can be secured in a country town. We try to get close to the consumer, therefore retail most of our produce, running a sales-wagon every week in the year. We run this wagon once or twice a week during the winter, twice or three times a week during the spring, and daily during the summer. We also run a wagon daily for three months to the summer resorts at Lake Bomoseen, alternating each side of the lake, so we reach customers every other day. We try to raise everything we can on the farm, but at certain seasons piece out with Southern stuff, although it is not comparable to our home-grown fruit and vegetables.

"It is strange that our state does not grow more small fruits, raspberries, gooseberries, currants, etc. Our strawberries always sell at 15 cents, raspberries at 18 to 20 cents, and I think there is no section of the country more sure to produce good crops. Crates can be had for nothing, or for a mere trifle, compared with what the Southern producers have to pay, and when we realize what a low price the fruit must net them, it would seem that we are neglecting our opportunities not to supply fully our home market. When I think how the high cost of meat, together with more cultivated tastes, is turning the people to the fruits and vegetables of the farm, I grow enthusiastic over the possibilities of the home market.

"We do not propose to hide our light under a bushel. Every other business advertises, why not the farmer? We try to keep people thinking about Valley Farm in connection with good things to eat. We take space by the year in our local paper, and print sometimes a list of what we have to sell, sometimes a little fun, anything to make people read our ads., and we know they do read them. To sum up, we try to have a large variety of fruits and vegetables. We try to develop and increase the local market, to get a reputation for a square deal, and to let people know what we are doing."

In 1909 Vermont produced 891,825 pounds of nuts, compared with 541,895 pounds produced by all the other New England States. Only eleven States exceeded Vermont in pounds of nuts produced. Butternuts, hickory nuts and beechnuts are the principal Vermont varieties. The butternut is one of our most rapidly growing trees, and the production of this valuable nut might be increased largely.



A VERMONT MORGAN HORSE.



THE RIPENED CORN.

HORSES.

For the better part of a century Vermont has been famous as the land of good horses. It was John G. Saxe, the poet, who said:

"Vermont is famous for four things—

Men, women, maple sugar and horses;
The first are strong, the latter fleet,
The second and third exceedingly sweet,
And all are uncommonly hard to beat."

As the home of Justin Morgan, founder of the famous Morgan strain, Vermont has ranked high in the breeding of horses. From 1850 to 1860 Vermont raised and sold more horses than any other state in the Union. For a time the raising of Morgans was neglected, but the development of this wonderful breed has been revived and again Vermont has the opportunity to increase it's prosperity by raising a larger number of high grade Morgan horses.

The horse, Justin Morgan, was owned by a man bearing that name, who emigrated from West Springfield, Mass., to Randolph, Vt., about the time of the birth of the animal, in 1789. The Morgan Horse Register says the horse was sired by True Briton, said to have been captured from Col. James DeLancey, a British officer, during the American Revolution. By many it is supposed that Justin Morgan was descended from Arabian stock. When a colt he was brought to Randolph by Mr. Morgan, who used him later as a breeding animal. Afterward the horse was sold, being owned in St. Johnsbury, Montpelier and elsewhere.

The horse, Justin Morgan, was about fourteen hands high, weighed about 950 pounds, and was a dark bay with black full mane and tail. Solomon Steele of Derby Line, Vt., who knew the horse well, said: "No man of ordinary judgment could fail to discover his peculiar points of excellence, his oblique shoulders, high crest, fine ear, prominent and sagacious eye, perfect head, large and expanded nostrils, strong loins, long hip, deep and well spread chest, high withers, short pasterns, strong and sinewy limbs, with all the important muscles far surpassing in size those of any other horse of his weight ever seen in America." It was also said of Justin Morgan that he could "out-walk, out-trot, out-run, out-pull," every horse entered against him.

Six of the best known sons of Justin Morgan were the Fenton Horse, the Hawkins Horse, Sherman Morgan, Bulrush Morgan, Woodbury Morgan and Revenge. Black Hawk was a son of Sherman Morgan and Ethan Allen was a son of Black Hawk. Green Mountain Morgan was a son of Gifford Morgan, and he a son of Woodbury Morgan.

Green Mountain Morgan probably was one of the most beautiful horses ever reared in the United States. It was said of him by one who knew him well: "When moving I never saw such majesty embodied in horse flesh as was displayed by Green Mountain Morgan". His arched neck seemed clothed with thunder and his floating mane and tail, his eye of fire, his red distended nostrils revealed more perfectly to my mind the original of those fiery, magnificent coursers, the Greek ideal of the war horse, to be found in the Elgin marbles, than I ever saw elsewhere." Green Mountain Morgan was called by General Wool of Mexican war fame, "the finest parade horse in the country." In 1860, Governor Banks of Massachusetts, seeking the finest possible mount for a muster at Concord, sent to Williamstown, Vt. and secured Green Mountain Morgan for the occasion. Although the horse was then twenty-five years old, he showed no signs of age, played his part to perfection, and was "the observed of all observers."

While the Morgans as a rule, have not been famous as trotting horses, some of the speediest of American racers have had Morgan blood in their veins. Such a list would include Dan Patch, Lou Dillon, Uhlan, Dariel, Audubon Boy, Major Delmar, Sweet Marie and The Harvester. One of the most famous of American races was held June 21, 1867, when forty thousand people saw Dan Mace drive the famous Morgan, Ethan Allen, with a running mate, in a matched race with the great Dexter, winning the race. It has been said that probably no horse race in the country ever excited more enthusiasm than this.

General Sheridan's "Rienzi," which he rode to Cedar Creek from "Winchester, twenty miles away," was a Morgan horse, and General Custer's favorite horse was a Morgan. When one of the sculptors engaged to model the statuary for the Chicago World's Fair made a great model in clay of a typical specimen of the American horse, Vermont furnished a Morgan, a daughter of Daniel Lambert, for the model. It was fitting that one of the pieces of the silver service presented to the battleship Vermont should be embellished with the head of a Morgan horse.

The Morgans have been famous for their endurance. Many stories are told of the remarkable feats of strength of Justin Morgan and some of his descendants. In 1853 the New York Herald, in an article on the Sixth Avenue Railroad, said: "Four-fifths of all the horses employed on the road are from Vermont and New Hampshire and of these nearly all are of the celebrated Morgan breed."

Justin Morgan has been called the most remarkable animal in the work from the standpoint of prepotency. It is proper to quote a few of the many opinions expressed regarding this wonderful animal. In an article dealing with horses in Vermont, one of the editors of the Louisville, Ky. Journal, who

had made a tour of the Northern states in 1845, said: "There is no doubt whatever of this—that the breed of the Morgan horse was and is now in the few instances where it can be found, far the best breed of horses for general use that ever was in the United States—probably the best in the world; and it is remarkable that the breed was and is now known by many and striking peculiarities common to nearly every individual."

The American Farmer's Encyclopedia, published in Philadelphia, said in 1844: "Perhaps the very finest breed of horses in the United States when general usefulness is taken into consideration, is what is commonly known in the Northern and Eastern states as the Morgan horse."

The American Horse Breeder has said: "Probably no other family of horses ever existed in which so large a proportion of its members 'acted well their part' with greater honor to themselves and their family than that founded by the noted stallion, Justin Morgan. The majority of these were remarkably cheerful, docile and faithful in whatever station they were placed. Their great strength in proportion to their size was proverbial, and their endurance was wonderful. No horses of their size could compete with the old time Morgans, either for pulling logs in the clearing, loads on the road in a team, on the plow, the family carriage or under saddle on parade. There never has been a family that transmitted its valuable qualities with greater uniformity than the Morgan."

A correspondent of the Indiana Farmer said: "If there is any animal which is a friend to the farmer it is the Morgan horse, which, not so long ago, made good from drawing the entire family to church on Sunday, to hauling the big loads of hay from the meadows on a week day."

"There never was a better all-round horse on American soil than the Morgan, and liverymen everywhere bear testimony as to its value," says the Kansas Farmer.

David Buffum, writing in *Outing* on "Making Carriage Horses in America," said of the Morgan: "This family has gone on record as the gamest, the most beautiful, and all things considered, the nearest to perfection of any that America has produced. Though not as fast at the trot as some other families, they were all fast; they all showed uncommon endurance, and stamina; they had the points of equine excellence and elegance that distinguished the Arab; and they bore themselves as superbly as the proudest of the aristocratic sons of the desert."

President Benjamin Harrison attended a meeting of the Vermont Association of Road and Trotting Horse Breeders at White River Junction in 1891, and said: "I understand that it was so arranged that after I had seen the flower of manhood and womanhood of Vermont, I should be given an exhibition of the next grade of intelligence and worth in the state—your good horses. I had recently through the intervention of my Secre-

tary of War (Hon. Redfield Proctor), the privilege of coming into the possession of a pair of Vermont horses. They are all I could wish for, and, as I said the other day at the little village from which they came, they are of good Morgan stock, of which someone has said that their great characteristic is that they enter into consultation with the driver whenever there is any difficulty."

W. H. H. Murray, who has written so charmingly of out-of-door life, has said: "The reproducing capacity of this horse (Justin Morgan), considering the treatment he received, was simply marvelous. Unappreciated and abused half his life, it was the merest accident that his value as a stock horse was discovered at all; and even then he was bred indiscriminately to mares, unassisted by the least intelligence in the matter. Still, in spite of all obstacles which neglect and ignorance imposed, the reproductive faculty was so superlatively strong that he founded a family true to the original type and more able to protect itself from infringement of foreign blood than any family of horses, perhaps, that the world has seen."

When the racing craze arose in this country the breeding of Morgans was neglected, and for a long period little attention was paid to this distinguished Vermont family. In 1905, however, Senator Proctor of Vermont, long chairman of the Senate Committee on Agriculture, succeeded in interesting the Department of Agriculture in the revival of the Morgan type. Col. Joseph Battell of Middlebury, Vt., gave to the United States in 1907, 435 acres in the neighboring town of Weybridge as a breeding farm. There are now about seventy Morgan horses on this farm, including eight or ten of the finest Morgan stallions to be found.

G. H. Rommell, chief of the Bureau of Animal Husbandry, says: "If we can get the Morgan back we will have reproduced a breed of horses that is without exception the best that the United States has ever seen—it is possibly one of the greatest breeds of horses that the world has ever seen. The Morgan horse, bred true to type, had qualities that made him valuable on the farm or as a carriage horse, and that made him salable. * * * If we can produce a Morgan horse that will be profitable on Vermont farms, to Vermont farmers, we will by so doing bring to Vermont what has brought to the state more fame than any other one thing—her great men alone excepted."

In order to give the farmers of Vermont a larger opportunity to breed from Morgan stallions than they would have if only the Morgan breeding farm at Weybridge were accessible, the government has directed that good Morgan stallions be located at several other places in various parts of Vermont. Farmers must furnish sound mares of a square trotting gait and if they will give the government an option on the colt of \$150, when three years old, the service of the stallion is free. If the government does not wish to take the colt no charge will be made for

the service. If the farmer thinks the colt is worth more than \$150 then he must pay a service fee of \$25 for mature stallions and a smaller fee for younger horses.

During the summer of 1915 seven stallions were placed in the field for breeding purposes, as follows:

Daniel Webster, Alburg.

Dewey, Charlotte.

Bennington, Randolph Center.

Castor, Chelsea.

Donlyn, Woodstock.

Troubadour, Perkinsville.

Snoqualmie, Monroe, N. H.

Three hundred mares were bred to these stallions during the past season, under what is known as the Army Remount plan.

This affords an excellent opportunity to raise good horses at a profit. The problem of securing remounts for United States cavalry regiments is a difficult one, and a good market is assured. Mr. Rommell, already quoted, has said that the Vermont and Maine cavalry were by far the best mounted of any in the Union army during the Civil War, and these regiments generally were mounted on Morgan horses.

The Morgan Horse Club is an active organization which meets annually at the time the Vermont State Fair is held, and some notable exhibits of Morgan horses—the best to be seen in the country—are shown on these occasions.

The breeding of Morgan horses is one of Vermont's opportunities. The reputation of these horses already is established, there is a good market for them, and with the aid afforded by the United States government this is an opportune time to enter upon such breeding.

The raising of other breeds of horses will be found profitable in Vermont—large draft horses, for example. It is estimated by competent authority that Vermont farmers are sending \$500,000 yearly out of the state for the purchase of Western draft horses. It ought to be profitable to raise such horses here, not only to supply the home market, but the markets of other states.

SHEEP.

The last census figures show that in only two states was there a larger average value per fleece of wool, than in Vermont. No state showed a larger average value per pound of wool than Vermont, although three other states showed the same average value.

For nearly a century Vermont has been famous for high grade Merino sheep. To the states of the West and South, to Argentina, to Australia and to South Africa, have gone Vermont sheep to improve the quality of the breeds in those states and countries.

Kenneth H. Atwood, a graduate of the College of Agriculture of the University of Vermont in the course of his senior thesis, published later by the State Commissioner of Agriculture as a bulletin, says: "Few states are better adapted to this industry than is Vermont. Her soil, climate, topography, natural grasses, and the skill attained by her breeders, have produced Merinos never surpassed and seldom equaled by those of any other state or country.

"It is known that Merino sheep were brought into Vermont previous to 1808. A Mr. Stoddard of Rupert, owned a flock of Merinos before that date. In 1808 Colonel Humphrey placed two valuable imported rams on a farm in Hartland.

"Hon. William Jarvis, who had been United States Consul at Lisbon, Portugal, and charge d'affaires, imported a flock of four hundred Spanish Merinos, bringing them to Claremont, N. H., and in 1811 he transferred them to a farm he had purchased at Weathersfield, Vt., in that fertile region of the Connecticut valley known as "Weathersfield Bow". At different times he is said to have imported as many as 3,500 Merinos. Spain was obliged to sell her world famous flocks of sheep, which she had been improving for a thousand years, in order to pay the cost of war, and Mr. Jarvis took advantage of the opportunity. Other smaller flocks were imported to Addison county towns. Some of the Atwood Merinos, bred by Stephen Atwood of Connecticut, were brought into Vermont. Edwin Hammond of Middlebury, breeding from Atwood Merino stock, made notable improvements in the breed, including great gains in the length and fineness of the wool. It has been said "that he converted the thin, light-boned, imperfectly covered sheep into models of compactness, covered with valuable wool."

PRICES AND PRIZES.

Nowhere else did the Merinos attain such a degree of excellence as in Vermont. An indication of the standing of the Vermont Merinos is furnished by records of prices and prizes received. The two original Humphrey rams were valued at \$1000 and \$950, respectively. In 1833 A. L. Brigham paid \$232 per head for a flock of 261 Spanish Merinos. California, a ram bred by Mr. Hammond, sold for \$10,000. Gold Drop, from the same flock, was valued at \$25,000 and offers of \$10,000 were refused. The ram Comet at three years old had brought his owner \$3,000 in service fees, while another ram at his death was reported as having earned \$20,000 for his owner. Twelve sheep, taken by George Campbell of Westminster to the exposition at Hamburg, Germany, sold for \$5,000. For many years Australian breeders paid \$500 and upward per head for Vermont sheep. In 1862-63 prices for rams ranged from \$100 to \$2,000.

Twelve Vermont Merinos, bred by Mr. Campbell, took two first prizes and one second prize at the International Exposition at Hamburg. At the Philadelphia Centennial Exposition, in 1876, Vermont took five first and four second prizes out of a total of thirteen firsts and fifteen seconds. The sweepstakes for the best ram of any age was won by Bismarck, owned by H. C. Burwell of Bridport. The \$100 prize for the best flock went to Joseph Stickney of Shoreham. Bismarck produced in one year a fleece weighing 35 lbs. 9 $\frac{3}{4}$ oz. A Pomfret ram yielded 37 $\frac{1}{2}$ lbs. What is said to have been the heaviest fleece ever secured at a Vermont sheep shearing contest, weighed 44 lbs. 3 oz. The proportion of the wool clipped to the total weight of the sheep was increased from 6 per cent in 1812 to an average of 22 per cent in 1880, and in some cases the average has been as high as 36 per cent.

In a volume of the United States census reports for 1860 it is stated: "At present as fine sheep as any in the world are produced, especially in Vermont. Four prize medals were awarded to American exhibitors of wool at the London exhibition in 1851, and at the International exhibition in Hamburg in June, 1863, Vermont Merino sheep took two first-class prizes as having the heaviest fleeces and the longest wool of any of that class exhibited, although the choicest flocks of Europe were represented."

Nearly 7,000 Merinos were shipped from Middlebury during a period of four years, exclusive of large numbers sent in small lots by express.

One who has studied the conditions in Vermont says: "The increasing popularity of lamb and mutton as meats spell success for the Vermont breeders of the mutton type. The nearness to market and high quality of the product should enable Vermont to compete successfully with range fed mutton, even though the gain in weight is secured more economically. Choice breeding animals of the mutton type are also good property. Many breeders now are successfully catering to this demand and there is plenty of room for more to engage in this pursuit. * * * Many well-clad but rugged pastures are so located as to be ill-fitted for dairying, while they will support sheep to good advantage."

At the annual meeting of the Vermont Dairymen's Association, held in Burlington January 5 and 6, 1910, C. C. Jones of Bennington, manager of the Fillmore Farms, who lost his life later on the ill-fated steamer *Titanic*, had this to say concerning opportunities for sheep raising in Vermont: "Vermont was the state in all the United States at one time in which to find wool sheep. When I was in Texas we came all the way to Vermont to buy our stud stock, and we got good ones. Why? because they were raised in Vermont. We have in this state the facilities for producing the best stud sheep that the world knows. * * *

"There is a grade of sheep that we can handle here more profitably than in any other section in the United States, and that is the so-called 'hot house lamb', which is not a hot house lamb at all. It is a fall lamb and there is no place in the country where that lamb can be produced cheaper or any better than right here in Vermont. In New York City the demand every year is beyond the supply and the man who cannot raise a lamb in from nine to twelve weeks, and sell him profitably for \$10 has something wrong with him. The trouble is not with the sheep. I commenced to ship to New York markets last year the 21st of December, and continued until the 10th of February. The least that I got for a lamb was \$10.20 net. These lambs were not sold to private customers, but were sold to a commission man through open market, just where any one of you could sell them, and they were raised just as any one of you could raise them." The Fillmore Farms comprise about five thousand acres, mostly in Bennington, and a specialty is the raising of Horned Dorset sheep.

It is a well-known fact that sheep are beneficial to worn out pastures, and it is stated that sheep will eat ninety per cent of troublesome weeds. Certainly Vermont offers good opportunities for profitable sheep raising.

SWINE.

The census of 1910 showed that at the time the enumeration was taken there were 94,821 swine in Vermont, valued at \$974,779 or almost a million dollars, and only three states exceed Vermont in the average value of all swine. An excellent market is offered and a good profit can be made in raising pork products. In only two states did the price exceed that in Vermont. It is possible largely to increase the number of swine raised, particularly if the milk is not shipped away so that a portion of the dairy products is available for feeding purposes.

POULTRY.

Poultry on Vermont farms numbered a little less than one million birds in the census of 1910, 938,524 to be exact, having increased from 843,165, reported in 1900. The value of Vermont poultry was appraised at \$607,787, compared with \$421,195, ten years earlier. The eggs produced in 1909 as reported in the census figures, amounted to 7,037,082 dozens, valued at \$1,715,221.

In 1910 only seven states exceeded Vermont in the average value of all fowls; only ten states in the average value of chickens; only nine states in the average value of geese; only six states in the average value of ducks; only five states in the average value

of turkeys. Only three states exceeded Vermont in dozens of eggs produced per farm, in farms reporting eggs in 1909.

An illustration of what can be done in the poultry business in Vermont is furnished in an article appearing in the New England Homestead several months ago concerning the poultry plant of H. P. Gilbert, a Bennington county man. About six years ago Mr. Gilbert started with a few old hens, and no financial backing. Today he has one of the most extensive poultry establishments in New England. The colony system is used, there being fifty-six small houses at the time the article reported was written. About eight thousand birds were hatched the previous spring and four thousand hens were wintered through. This primarily is an egg producing plant, and Mr. Gilbert gathers an average of two thousand eggs daily during mid-winter. On December 1, 1913 he received 64 cents per dozen for his eggs and he was able to contract his eggs for a year at prices above top quotations. The young cockerels are disposed of early to a nearby summer hotel, the returns averaging from 35 to 50 cents each.

M. A. Jull, manager and lecturer for the poultry department of MacDonald College, Quebec, has said: "The system of mixed farming as carried on in the state (Vermont) is ideal for the rearing of poultry. Vermont is so well adapted for poultry raising that it should be producing poultry products in large quantities for the markets which are so near. Vermont is splendidly located in respect to markets. Her home markets are good and she also has large markets near at hand. New York City is about 250 miles by railroad from the central portion of the state and if the right classes of goods are produced and shipped to New York the best prices will be received. There are other large markets, all of which are within easy reach of the more important centers of the state. The fact that there are so many large markets near the poultry producers of the state is a very important asset, since eggs and poultry products can be shipped to these markets and sold the following day, while perfectly fresh, and freshness is one of the chief factors controlling the price.

"Vermont is so well adapted for turkey raising that it is surprising that so few turkeys are raised. Another surprising feature of the poultry industry of the state, is that there are so few ducks raised. In many places where the markets are right and transportation facilities are good, as much, if not more money can be made with ducks as with chickens.

"The poultry industry is more independent of climate than other branches of agriculture. The climate of the state as a whole is quite favorable. The country is naturally hilly and broken and many of the valleys provide excellent shelter for poultry plants."

The demand in the great cities for strictly fresh eggs is so much greater than the supply that a great opportunity is offered. Vermont, so near these markets, should be able to supply this demand, in part, at least. The average price paid Vermont farmers in 1914 for eggs was 28½ cents per dozen, according to United States Department of Agriculture figures.

The boys and girls of Windsor county, Vermont, are being organized into poultry clubs, under the auspices of the county Y. M. C. A. organization. The first prize in the contest No. 1 was given to the member hatching the largest number of eggs, and another to the one having the largest number of chicks still living at the end of four months, out of a setting of 15 eggs. The second prize went to the member having the largest total weight of chickens out of 15 eggs four months after hatching; third to the member writing the best composition on hatching and rearing chickens. There were also special badge awards.

In contest No. 2, the first prize went to the member rearing the highest scoring bird shown at an exhibition to be arranged for in the fall; second, prizes for the best of the various varieties will be offered; third to go to the member with the highest egg record from pullets raised up to January 1; fifth, to the member presenting the best article on winter egg production; sixth, to the member showing largest profit in proportion to cost of raising the chickens from 15 eggs. Poultry Clubs are being organized by the Extension Service of the College of Agriculture.

BEE-KEEPING.

Vermont leads New England in the number of colonies of bees reported in the census of 1910, and in pounds of honey produced and only four states of the Union produce more pounds of honey per capita than Vermont, according to the census figures.

H. W. Beecher, a graduate of the College of Agriculture of the University of Vermont in the course of his senior thesis, "Bee-keeping in Vermont", published later by the Commissioner of Agriculture, says: "Many culturists explain that conditions here are the best in the country. Certainly if proper methods are employed, excellent results may be obtained. Vermont has been fortunate in not being devastated by bee diseases that have been so prevalent in other states."

The total average yield of thirty-eight bee-keepers reporting to Mr. Beecher was 37.44 pounds of honey per colony. Mr. Beecher says: "Considering that this report was received in 1909, when the honey production was very low, Vermont bee-keepers are to be congratulated on these results, for it is a relatively high average. This simply proves the statement that the conditions here are of the very best for this product." The average yield of honey in Vermont is from thirty-five to forty pounds

per colony. One bee-keeper reports an average yield of 44.6 pounds of comb honey for a period of eighteen years, the price being from 15 to 20c per pound. A Fair Haven man reported 160 pounds from a single colony. Addison county produces nearly as much honey as all the other Vermont counties combined, the production of this county in 1910 being 125,000 pounds. J. E. Crane of Middlebury not only is the leading bee-keeper of Addison county, but also of Vermont, and perhaps of New England. In 1909, Mr. Crane had 635 colonies and reported a yield of 42,000 pounds of honey in a single season. He ships his product to New England cities, Chicago and London. In 1909 eleven other Addison county bee-keepers each had one hundred or more colonies of bees.

In addition to the direct profit from bees they are of great value in pollenating crops and particularly are beneficial to apple growers. The state has provided an apiary inspector to aid in keeping bee diseases out of Vermont.

FORESTRY.

In a state like Vermont, which contains large areas of mountain lands, one-third of the Vermont farm lands being in woodland, forest products may be considered properly as one of the most important crops. Lumbering is one of the leading Vermont industries, and the opportunities for the successful growing of timber are many. According to the figures of the last census only seven states exceeded Vermont in value of forest products per farm. Large quantities of timber are required for wood working industries, and these industries may be increased largely. There are few states better adapted than Vermont to profitable forest growing. State forests have been established as follows: Downer State Forest, Sharon, 800 acres; L. R. Jones State Forest, Plainfield, 600 acres; Hapgood State Forest, Peru, 900 acres; Battell State Forest, Duxbury and Huntington, 1,200 acres; Lyndon Sand Forest Plantation, Lyndon, 75 acres; George Aitken State Forest, Mendon, 850 acres; West River State Forest, Townshend, 700 acres; Arlington Forest, 225 acres; West Rutland Forest, 350 acres; Mansfield forest, 5,000 acres. Putnam Forest, Worcester, 1,100 acres; Proctor—Piper Forest, Cavendish, 400 acres. The Hapgood State Forest also is called Bromley Mountain Park, and Battell State Forest, including the summit of Camel's Hump, one of the highest peaks of the Green mountains, is sometimes called Camel's Hump Park. Large additions have been made recently to the forest on Mount Mansfield.

A state forest nursery has been established at Burlington, which distributed 991,505 trees in 1915 to private owners and to state forests. A summer school of forestry and horticulture

has been held at the Downer State Forest in Sharon. Conferences have been held and exhibits made at fairs. Fire wardens are appointed and a system of lookouts is maintained to guard against the spread of forest fires.

The legislature of 1912 passed a law relating to the taxation of young timber, which is regarded as an encouragement to the planting of forests, Vermont being the third state of the Union to pass legislation of this nature. This law provides that the lands specially classified under this act may include cut-over or other land fully stocked with forest trees not more than fifteen years old, except scattered trees, the presence of which does not increase the assessed value of the property; cut-over or other land incompletely or partially stocked with forest trees not more than fifteen years old, when planted with a sufficient number of additional trees to assure a spacing approximately of 6 x 6 feet over the entire area; and open land planted with forest trees not less than one thousand to the acre, provided that they are species approved by the State Forester, and provided further that the land is outside the limits of cities and villages. Such lands must be examined and approved by the state forester to benefit by this tax law. Lands so classified are to be taxed at the local rate on a valuation of the lands, valuation to be established by the listers, but in no case to exceed \$3 per acre, said valuation to be maintained until 1950, when the land shall be revalued, the valuation to be established for a further period of fifty years. Whenever a commercial cutting is made a tax of ten per cent shall be levied on the gross stumpage value of the amount cut. This does not apply to material used and not intended for sale.

Another law was passed at the session of the legislature of 1912, applying to forest growth over fifteen years of age, which supplements the law first mentioned. Such growth may be specially classified under this law and when so classified it shall be taxed according to the last preceding quadrennial appraisal and no raise shall be made until 1950, when it may be revalued. An additional tax of one-tenth of one per cent per annum for the period the land has been classified is levied on the gross stumpage value of timber cut. If land has been classified twenty years and 100,000 feet of lumber has been cut worth \$6 stumpage, the additional tax would be \$12.

The most extensive private forest plantation in Vermont is that owned by Dr. William S. Stevens in Enosburg. During the past six years he has planted 250,000 trees, mostly white pine seedlings.

The Vermont Sanatorium at Pittsford has been practicing forestry on lands owned by that institution. In Barnet a forest of about fifteen acres on land only forty-five years removed from growing a crop of oats, is now covered with white pine, the largest trees being eighteen inches in diameter, easily worth \$500 per

acre, all grown on land considered too poor to keep in cultivation. On the Billings estate at Woodstock are pines planted twenty-eight years ago, now two feet in diameter, and Norway spruce over 30 years old, both very valuable.

According to the last census report only one state exceeded Vermont in value per square mile of land area of forest products of farms in 1909, and that state exceeded Vermont by a very narrow margin. Twenty-two states exceeded Vermont in aggregate value of forest products of farms in 1909, according to census figures. Vermont's aggregate was only a trifle less than that of the great forest state of Washington. It is evident that under wise forest regulations Vermont forests may become a much greater source of permanent revenue than heretofore.

AGRICULTURAL EDUCATION.

Vermont is committed thoroughly to a broad policy of agricultural education that cannot fail to be of great benefit to the state. Collegiate instruction, research and extension work are conducted by the land grant institution of the state, the University of Vermont and State Agricultural College; secondary school teaching in agriculture is being done in a dozen or more high schools and academies; in several junior high schools agricultural instruction is made a prominent feature; and finally state schools of agriculture have been established at Randolph and at Lyndon.

University of Vermont, College of Agriculture.

The University of Vermont and State Agricultural College is located in beautiful Burlington, a city that is popularly known as the Queen City of Vermont. The buildings of the college are on high ground on the eastern border of the city, overlook Lake Champlain and the Adirondack mountains on the west, and the Green mountains, with Mansfield and Camel's Hump prominent on the horizon, on the east. The College of Agriculture occupies several buildings, but its main home is a building called Morrill Hall. This was the first real gift of the state to agriculture, in honor of the senator who introduced the bill providing the national grant for the establishment of state colleges throughout the country.

The work of the College of Agriculture is of three sorts. It teaches students in long and short courses; it endeavors to discover facts relating to agricultural operations; and it strives to reach the people on their own farms and in their own homes with information that has bearing on farm and home life. These three phases of its work are known as the College, the Experiment Station and the Extension Service.

THE COLLEGE.

It is the aim of the College of Agriculture to impart to its students information both theoretical and practical, which may enable them successfully to engage in agricultural pursuits. Courses are given in agronomy, horticulture, animal husbandry and the training of teachers in agriculture in the secondary schools. Instruction is offered in soils and soil management, field, grass and forage crops, breeds, stock breeding, sheep, swine, poultry, stock feeding, dairying in all its manifold phases, farm management, farm mechanics and equipment and rural economics. In botany, stress is laid upon the general principles of the subject, the systematical arrangement of plants and the fundamental application of botanical science to economic plants. In zoology, attention is given toward the development of a good understanding of the fundamental principles and various forms of animal life, especially of insects. In veterinary science the anatomy of domesticated animals, the physiology, histology, and diseases of animals are taught. In horticulture, vegetable gardening, fruit growing, landscape gardening, plant breeding and greenhouse management are the leading features. In forestry, attention is directed to the management of timber lands, forest mensuration, botany of forest trees, nursery management and reforestation.

Winter short courses have been held annually for more than twenty years. These attract from 50 to 60 young men annually and last for nine weeks in the winter. Farmers' week, a five-day open house at which farmers and their wives are welcome is held in late February. Lectures and demonstrations are offered and several hundred visitors usually attend.

Visitors always are welcome at the college. For the most part the buildings are open to interested parties, classes may be visited, buildings inspected and instructors interviewed. The greenhouses, dairies, botanical, forestry and horticultural collections, also household economic rooms, are places of interest.

The College of Agriculture is supported in the main by federal funds derived from the so-called Morrill (1890) and Nelson (1907) enactments. The legislature of 1912 appropriated a small sum for two years nominally for scholarships, in this college which as a matter of fact were but partly available, save in this one instance.

The instructional staff numbers eighteen, exclusive of special instructors and in winter short course work.

THE EXPERIMENT STATION.

The Vermont Agricultural Experiment Station is organized under an act of the General Assembly of 1886, and by subsequent federal acts of 1887 and 1906. It was founded with the idea of

carrying on scientific research in agriculture or matters relative thereto. In the earlier days much of its work was less scientific and more popular than was contemplated by law, but in later days by virtue of government regulations, it has had to confine itself more strictly to experimental and investigational work which has bearing and direct application to Vermont agriculture. In addition to its scientific studies the station is prepared to analyze fodder and feed especially for domestic cattle, seeds and milk which are deemed to be of benefit to the agricultural public of Vermont.

Its experimental work is of several kinds and characters. The general importance of dairying in Vermont has seemed to justify special attention to research work along the lines relating to crop production, dairying and creamery management. To this end the station has the use of a two hundred-acre farm and a dairy in excess of sixty head of cattle, with sufficient men to take charge of the several aspects of the work. Extended trials have been conducted concerning the value of different feeds and their effect upon the milk flow and on the life of the cow. Within recent years particular attention has been given to development work in forestry, as specially related in the management of timber lands, the caring of nursery trees and the general management of forest areas. In horticulture, much attention has been given to the study of the potato and its enemies and ways and means of meeting the various problems arising in the production of this important Vermont crop. The work of the botanical staff relates to the study of diseases of cultivated plants, the culture of forage plants and the control of injurious weeds. The veterinarian has prosecuted far-reaching studies of the diseases of dairy cows. The analysis of commercial fertilizers and feeds, and the testing of creamery glass-ware in accordance with state law, constitute a part of the numerous duties of the chemist of the station, and the botanist similarly keeps his hand on the seed trade of the state.

The station has published bulletins to the number of nearly 200. Many of these are of a scientific nature by reason of federal regulation, but none the less valuable. Bulletins are sent out to interested parties on request. The usual size of the edition at present is 15,000 copies and there are 9,000 names of Vermonters on the mailing list. Publications are not issued regularly, but whenever a piece of work is completed and ready for presentation. Bulletins of the station are free, and are mailed upon request.

The experiment station is housed for the most part in Morrill Hall and under the same roof with the College of Agriculture. Interested parties are welcome to visit the research laboratories, barns, dairy, greenhouses and other buildings on request.

THE EXTENSION SERVICE.

The agricultural extension service is developing into an important feature of the work of the College of Agriculture. The national government aids in financing the service and Vermont has appropriated \$8,000 a year to aid in carrying on this work. The institution thus is enabled in the language of the state enactment to conduct "extension work in agriculture and home economics in cooperation with the state relations service of the federal Department of Agriculture and in accordance with the provisions of the federal act." This act concretely sets forth the duties of the several state colleges of agriculture in this line. Its main lines of activity comprise:

1. Informational correspondence with Vermont farmers.
2. Extension schools located in towns widely scattered over the state.
3. Educational exhibits at the state and county fairs.
4. The supervision of the county agents in Addison, Bennington, Caledonia, Chittenden, Franklin, Orange, Orleans, Rutland, Washington, Windham and Windsor counties, jointly employed by the United States Department of Agriculture, the College of Agriculture of the University and the several local county organizations.
5. The location and oversight of demonstration plots all over the state, illustrative of various desirable but not well understood farm practices.
6. The issuance of educational and informational leaflets.
7. Agricultural addresses before farmers' clubs, granges, women's clubs and other organizations; preferably when in the form of "chains".
8. Visitation and local advice.
9. The establishment and supervision of the work of boys' and girls' clubs.

The educational exhibit consists of pictures, charts, samples, specimens and pieces of apparatus, each arranged to illustrate and emphasize a definite point. Experts are in attendance to answer any questions which any part of the exhibit may suggest. The extension school is a school of instruction for farmers, described as "more formal, more educative, more helpful, lasting longer than the farmers' institute. Lessons and demonstrations are given, and wherever possible actual practice is given. The farmer-students not only are told how and shown how to prune a tree, to judge a cow, or test a soil for acidity, but, under direction, actually do these things." These schools usually last from Monday afternoon to Friday afternoon.

A number of boys' and girls' clubs have been organized in various parts of the state. Demonstration plots by the hundred located in various parts of the state are established with a view of demonstrating particular features, such as the use of lime, the

spraying of potatoes, the use of different forms of plant food, etc.

State University men are sent out to give lectures before granges, farmers' clubs and boards of trade, when arrangements can be made for giving several lectures on the same trip. Farm visits will be made when arrangements can be provided for a series of such visits to various farms.

The activities of the College of Agriculture are quite similar to those in other states throughout the Union, for they exist in every state. The Vermont college located in a small state, with a small population is of course not as well endowed as are most of her sister agricultural colleges elsewhere. But in one respect and in this connection, Vermont can justly claim prominence. From her loins, product of her soil, was Justin S. Morrill, Representative and Senator from Vermont, originator of the federal bill, which created the great system of colleges of agriculture and the mechanic arts the country over. On every agricultural college campus the nation over, unborn generations will rise and call him blessed.

Middlebury College.

While Middlebury College is not a technical institution, it endeavors to give a broad cultural education without reference to particular industries. In the various scientific branches, however, there is constant reference to the industries of Vermont, especially agriculture.

The college catalogue shows that instruction is given in subjects bearing directly on agriculture, such as fungi and lichens, bacteriology, conservation of natural resources, entomology, chemical analysis of agricultural products, surveying and plotting, highway surveying, and applied geology in its bearing upon agricultural pursuits. The new chemical laboratory has a room devoted to milk and water analysis.

Each winter recently the college has cooperated with the Addison County Agricultural Society in holding a farmers' institute at the United States government farm at Weybridge. Several experts from the Department of Agriculture have given most instructive addresses and conducted judging demonstrations. These have been largely attended by the farmers of Addison county.

The State Schools of Agriculture.

The legislature of 1910 established a state school of agriculture at Randolph Center, and the legislature of 1915, accepting the munificent gift of the Hon. Theodore N. Vail of Lyndon, created it "Theodore N. Vail Agricultural School and Farms." The state agricultural school at Randolph Center is



A HAYING SCENE.



A VERMONT MERINO SHEEP.

doing excellent work. Principal G. L. Green said of the institution: "The Vermont State School of Agriculture was established in 1912 to develop our various agricultural interests. It is a school especially equipped and peculiarly fitted to train young men for living in the country. It demonstrates the possibilities of scientific agriculture as a business proposition and as an occupation the peer of all others in importance and comparable to any of them in dignity. In short, farming is clearly shown to be a profession in the highest and broadest sense and as such is worthy of the most faithful service and keenest study which any man can give to it. The chief aim of the school is to keep more of our strongest young men on Vermont farms.

"The courses of the school cover the entire field of agriculture. Strong general courses are given also in English, physics, chemistry, botany, law and history. The technical courses include animal husbandry, agronomy, dairying, horticulture, poultry culture, bacteriology, blacksmithing, plumbing, carpentry, etc. The most up-to-date texts to be found are used in teaching the various subjects and the theoretical work of each course is reinforced and reduced to practice by a large amount of required work. In fact, the shops and dairy connected with the school are run by student labor, partly as laboratory work and partly as pay work.

"The tuition is free and the living expenses of a student with the advantages for self help which the school offers, are very low.

"A high school graduate who has maintained a high standard in scholarship during his high school career, may, upon getting the consent of the principal complete the regular course of the school in one year. For others two years will be required.

"No examinations are required for entrance, but no student will be admitted who is not at least in his sixteenth year and who has not completed the work of the common schools.

"The school graduates a class of forty-four members this year practically all of whom are definitely located for the next year's work. The majority of these men will go back to their home farms for the present. The remainder have engaged to become testers in cow test associations, managers of farms, teachers of agriculture in high schools, and farm hands. Of the forty-four men, only one intends to locate outside of Vermont, and every one of the forty-four plans to own a farm in Vermont at the earliest possible moment. This proves that the school is doing just what its establishers wanted it to do."

The above letter was written for the first edition of this book. A letter received recently from the principal of the same institution says: "I do not know that I can add very much to the material which I formerly submitted. I might say that we shall have graduated over a hundred men by the end of the fourth

year of the school's existence, and that our total enrollment up to that time will aggregate about two hundred and fifty. Fully ninety per cent of these young men have settled in Vermont and are engaged in agricultural occupations, the great majority have returned to the home farm, and together with their fathers, they are putting the new ideas of progressive agriculture into practice. One of our graduates has won conspicuous success as teacher of agriculture in Stowe high school. Those of our graduates who did not return to the home farm are engaged in various parts of the state as farm managers, herdsmen and managers of cow testing associations, except for the one who is teaching.

"The school is becoming known outside of Vermont. This year we have students from Massachusetts, Connecticut, New Jersey and Pennsylvania. Our enrollment for this year is seventy-eight. We now have a model dairy barn in which we have representative types of three of the leading breeds of dairy cows, Ayrshires, Jerseys and Holsteins. We also have model hennery carrying Barred Rocks, Buff Orpingtons, and Rhode Island Reds. We are a special school of agriculture and aim to turn out young men who shall be leaders and upbuilders of rural Vermont."

The school at Lyndon was established by T. N. Vail, one of America's foremost business men. One of the important acts of the Vermont legislature of 1915 was the acceptance of Mr. Vail's splendid gift to the state of the agricultural school, Speedwell Farms and farm buildings, together with equipment and stock, and two thousand acres of land equipped with buildings of all descriptions of the most permanent construction and in first class repair. The land is divided into tillage, pasturage, lumber and woodland. The woodland comprises four equipped sugar camps containing seven thousand trees and an estimated lumber cut of 1,500,000 feet. Within the last four years 50,000 forest seedlings have been planted.

There are at the farm and school at the present time, most of which are included in the gift, 268 head of cattle. Of these there are three registered herds, 22 Ayrshires, 63 Brown Swiss, 18 Holsteins, and a large herd of high grade Jerseys. There are forty-five horses on the farm, of which fifteen are registered, and thirty are work horses. The live stock also includes 100 sheep and 100 swine. The apple orchards on Speedwell Farms contain three thousand trees.

In describing the work of this school in the first edition of this book, issued before Mr. Vail made this gift, the principal wrote as follows: "The Lyndon School of Agriculture is designed to fit boys for practical farm work. We give them a two-year course, divided into theoretical and practical work. The theoretical work is given forenoons throughout the school year, which extends from September until June. The practical work

is given for the same length of time during the afternoons. The boys stay on the school farm throughout the summer months and carry on all farm operations.

"Boys enter this school on two systems. They may enter on the cash system and stay for the nine school months, or they may enter on the work system and receive credit for work, sufficient to defray their expenses. The cost of either system is \$200 per year.

"This school is well equipped with buildings and tools. Excellent representations of the different breeds of cattle are kept in the school barns. Arrangements have been made with the neighboring farmers for the use of their herds and flocks for demonstration purposes.

"The agricultural school is strictly a farmers' school and it aims to educate students along the various lines of work that will be met with on the farm and in the home life. It is not intended to fit students for college, but to furnish a line of training that will be of immediate use in farming and its allied industries, like carpentry, blacksmithing, masonry and concrete work, preparing the students not only to do the farm work intelligently, but also to do for themselves practically all the other work in connection with the farm, such as the repairing of buildings from basement to roof and the repairing of wagons and machinery, in a general way making them independent of any outside skilled labor, and also putting them in a position to assist their neighbors whenever spare time may permit."

The law provides for a board of trustees composed of "the Commissioner of Agriculture and the dean of the State College of Agriculture, ex-officio, and three trustees to be appointed by the Governor. * * * The Commissioner of Agriculture shall be chairman. * * * The board of trustees shall have general care and supervision, management and control of all schools of agriculture and farms maintained or in any way aided by the state.

There were during the past year about 150 students in these two agricultural schools, and the number is steadily increasing.

THE HIGH SCHOOLS AND ACADEMIES.

Agriculture is taught in many Vermont schools. There has been comparatively rapid development along this line in the high schools and academies of the state. In 1913-14 there were only four such schools employing specially trained agricultural teachers. In 1914-15 there were nine and this year, 1915-16, there are fifteen. In fact, the number of schools desiring to introduce agriculture is growing more rapidly than teachers are being trained, and the most difficult problem is the securing of competent teachers.

The sum of \$200 is granted annually to each four-year high school in the state that has a department of agriculture with a

specially trained teacher. The requirements are similar to those of teachers of agriculture in the junior high schools. There were eight schools thus aided at the opening of the year 1916.

JUNIOR HIGH SCHOOLS.

The legislature of 1915 revised the educational laws of the state and several sections of the new law directly affect agricultural education.

It is provided that junior high schools may be maintained in any town where the number of secondary school pupils warrant it and that each junior high school shall have a "four years' course flexible in character, designed for the instruction of pupils who have completed an elementary course of not less than six years, and suited to the number and need of the local pupils". The course of study for these schools is arranged by the state board of education and must include vocational opportunities. The expense of maintaining the vocational courses is borne by the towns in which the schools are located, but the state board of education reimburses the towns for "such expense as will tend fairly to equalize the facilities afforded by such courses and the burden of maintaining the same." The state board may provide land for instruction in agriculture at the expense of the state. The law provides that the state board of education shall "prescribe and supervise all vocational courses with the further provision that all courses in agriculture both of junior and senior high schools shall be approved by the trustees of the state agricultural schools". Each junior high school is required to give "a vocational course in one or more of the following subjects: agriculture, manual arts, commercial subjects or domestic science appropriate to the needs and environment of the particular school". Since junior high schools of course will be located in the small towns or villages and since the vocational course is required to fit the needs of the community, it will mean that agriculture must be taught in practically all of the junior high schools.

Six such schools already have been established. Here again the problem of securing the right teacher is most difficult.

The state board of education has adopted certain rules and regulations concerning the organization of junior high schools to go into effect at the opening of the next school year, that will help to standardize the work and make it more effective. Among those affecting the teaching of agriculture are the following:

a. The teacher of agriculture must be a graduate of an agricultural college (or the equivalent thereof) and must have had sufficient practical farm experience to enable him to interpret local conditions.

b. He must devote at least one-half his time to the teaching of agriculture. The time devoted to each subject must be

at least one forty-minute period each day with one double period per week for laboratory and field exercises, extra time to be given when projects demand it.

c. The equipment must be adequate to supplement the recitation and should include a laboratory or laboratories, ample in size and with sufficient apparatus to permit individual work.

d. The school year shall be at least thirty-six weeks in length. The teacher of agriculture must be employed for the twelve months devoting the summer months when school is not in session to the supervision of home project work.

The state board of education has arranged with the College of Agriculture of the University of Vermont to assist in the supervision of junior high schools and the teaching of agriculture and home economics in all other high schools. The department of agricultural education will be charged with this supervision.

DIRECT MARKETING.

A service which has been established recently by one of the large express companies doing business in Vermont, for the direct marketing of butter, eggs, dressed poultry, and other farm produce, should be of considerable value to producers of the state of Vermont. Through its different agents in the state, the names of local producers have been procured, with commodities handled, etc., and this information is to be published and placed in the hands of its agents and others at the larger centers, where there is demand for country produce. Individual consumers, hotels, clubs, and dealers are to be interviewed, with a view of securing orders for produce, and it is hoped to bring consumers into close touch with producers, to their mutual advantage.

Box manufacturers now are providing special containers designed for the handling of eggs, butter, poultry, etc., in small lots to ensure arrival at destination in good condition, and with the special rates made by express companies for handling country produce, shippers in this state should be in position to secure a considerable revenue from the direct marketing of their output. Particular attention is to be given by the express companies to the marketing of maple sugar and syrup, and such other commodities as circumstances may warrant.

The manager of a "new products department" of an express company, after describing some instances where great saving had been accomplished by direct marketing, said, according to a recent article in the *Boston Transcript* "Express has done more spectacular marketing feats than these. It has moved huge crops from whole areas of different producing lands and marketed them for the producer to excellent advantage. From the peach section of West Virginia, just recently, it helped find markets for over 3,500 carloads of peaches. In Texas and Ar-

kansas it works to make an efficient distribution of berries and tender vegetables to the city markets of the North and East—not in thousands, but in carload lots. For the melon growers of California, Colorado, and Illinois the express does much in wholesale way. Six thousand boxes of canteloupes per day marketed through the express from Illinois alone—that is a sample.

“If a housewife in Boston wants an eight-pound assortment of layer figs and cluster raisins, fresh from the grower in California, she need only send her order with her check to our local office. That order is promptly transmitted to the grower to be filled, and the shipment goes back to Boston as fast as an express train can carry it. California producers found a market for over 80,000 packages of this sort direct to consumers between November of last year and the first day of last May. Our food products department issued a twenty-page catalogue in the winter quoting a number of combinations by various growers, which did much to acquaint New Englanders and other Easterners with the great variety of California fruits, vegetables and nuts.

“Two obstacles have stood in the way of direct marketing. One was the occasionally unreliable farmer, and the other was the uncertain method of payment. Both difficulties have been overcome by the express. We don't send an order to a man unless we have investigated him, his product, and his honest dealing. We don't ask a farmer to fill an order except for cash or C. O. D. A quotation sheet is distributed each Monday to agents and householders and all others interested. It shows the varieties of produce obtainable, where it can be had, how packed, and cost delivered. Any agent will take an order and cash to cover it, giving a receipt for the money (C. O. D. costs a little more) and send it to the agent at producing point, who will pay over the money and see that the order is promptly filled and shipped. Quantities less than ten pounds cannot be shipped so economically as larger orders, but combination boxes of ten pounds of butter and fifteen dozen of eggs, or half a bushel each of apples and potatoes, a ham and a strip of bacon, etc., are available.

Larger quantities at lower prices are ordered by large families, and by buying clubs formed in neighborhoods, factories, stores, fire stations, where a number of people are employed. One club in Chicago has ordered over \$5,000 worth of various produce in a single month. Many clubs which started with an order for ten pounds of butter and fifteen dozen eggs have grown to considerable proportions and now have standing orders for several hundred pounds of butter and three or four cases of eggs weekly. A small family of three will use five or six pounds of butter and seven or eight dozen eggs a month at the least. By clubbing with the next door neighbor they can receive the supply for both

families fresh from the farm and save, by to-day's quotations, five cents a pound on their butter and twelve cents a dozen on the eggs—or \$2.30 a month on eggs and butter alone.

"For the purpose of increasing its own business, the express encourages the formation of cooperative clubs. These are not hard and fast clubs. They are composed of persons in a neighborhood, in a factory, store, office buildings, who say to one another 'Let's get all the fruit, butter, eggs, potatoes, ham and cheese we want for a month direct from the country in one shipment. In one New York office building there is a buying club of seven hundred members and during several months the joint saving has been from \$4,900 to \$5,600 per month. In a year that amounts to a distribution of a dividend of some \$60,000 to the seven hundred families represented. Out of the savings the club could each year buy a separate \$5,000 house for twelve separate members. Individual family figures of the express indicate that about one dollar is saved out of every five dollars spent—not to mention that the goods bought are fresh, and have never known an ice-box except on the express refrigerator car during the journey.'

"Suppose you own a farm, and had say thirty dozen of eggs, two hundred bushels of apples, one hundred bushels of potatoes, one hundred chickens, and fifty pounds of honey to dispose of. All you would have to do would be to call upon the nearest agent, give him a list of your stuff, telling him the absolute truth about its condition and letting him know just what week you would be able to ship items. He would give you complete instructions in regard to packing it; would tell you just where to buy boxes and cartons at the lowest price; then he would send your list, with the prices you asked, to one of the company's selling units, and in due course of time, say from a week to ten days, he would notify you how much had been sold for that week, and where to ship it. When the goods are delivered to the agent he would give you the money for it; if they were on a C. O. D. order he would give you a receipt and turn the money over as soon as it arrived."

The *Transcript* writer sums up the opportunities as follows: "Additional sales for the farmer, cheaper and fresher products for the consumer, more carrying work for the expresses—and no harm done to the parcel post, because this is extra work that is especially in essentials of ordering, advertising and investigating quality of products, the useful parcel post is not prepared to do."

PARCEL POST.

A letter from the First Assistant Postmaster General calls attention to the fact that at a few selected post offices the department is conducting the experiment of publishing lists of

farmers who desire to ship produce direct to consumers, by means of the parcel post. Boston, Mass. is one of these offices.

An illustration of the practical value of the parcel post as an aid in marketing is shown in the following extracts from a bulletin on "Shipping Eggs by Parcel Post," issued by the United States Department of Agriculture: "There is a most active, nationwide interest in methods of eliminating waste and expense in getting food products from the farm to the consumer. This is a natural result of prevailing high prices to the city buyer and low net returns to the grower. The farmer has lost much of his old time interest in growing larger, better crops at greater expense, which frequently bring him lower prices and smaller returns, or even losses, without reducing prices to the consumer.

"There are many products which are ready for use when they leave the farm; to a considerable extent these can be marketed direct by the farmer to the consumer. This will obviate the necessity for concentrating any given product in large quantities in storage in marketing centers, save the cost incident to this concentration and consequent redistribution, and get the product to the consumer in a fresher, better condition. The parcel post offers a channel or means for such marketing.

"The Postmaster General has done much to popularize the parcel post, and a great deal has been said in the public press in regard to its utilization in establishing direct business intercourse between country and city. The office of markets, in co-operation with officials of the Post Office Department has conducted an extensive study of possibilities of marketing various farm and food products by parcel post, with a view to promoting direct dealing when practicable. The work of shipping eggs has progressed to a point where definite conclusions based on experimental data can be stated. More than 700 dozens of eggs have been shipped experimentally through the mails, from various points, under various conditions, and in various different types of containers, without undue loss, showing that it is undoubtedly a feasible and practical method of transporting eggs. This is true both as regards the cost of shipment and the condition of the eggs on reaching the consumer's kitchen.

"While it is probable that for some time to come the great bulk of eggs which come from distant producing territory will be shipped by other methods, it is no doubt true that many cities can be supplied with a considerable portion of their fresh eggs from within the first and second zones by parcel post, to the advantage of both producer and consumer. By such direct contact the producer should secure somewhat better prices for eggs than are realized by present methods of marketing, and the consumer should obtain a fresher quality at no increased cost, or, frequently, even at a reduction in price. The producer who does not have satisfactory marketing facilities may find in the parcel post a

means of solving his egg-marketing problems. This applies especially to the man whose flock is so small that he cannot make case shipments, i. e., shipments in the regular 30-dozen-size egg case.

"Four hundred and sixty-six shipments were made in the experiments. They comprised a total of 760 11-12 dozens, or 9,131 eggs, in lots from one to ten dozen each. The number of eggs broken was 327, or slightly less than 3.6 per cent of the whole number. Of these, 209 eggs, or slightly less than 2.3 per cent, were broken too badly to use; the remaining 118 were usable. If 91 eggs broken in parcels known to have received violent uses be eliminated, the breakage resulting in loss is less than 1.3 per cent.

"These experimental shipments were made over various routes and distances, including not only local shipments over short routes but points as far away from Washington as Minneapolis, Minn. and the Rocky mountains. They began in October, 1913, and extended to February, 1914, thus including the holiday rush. The shipments have been sufficiently numerous to justify the conclusion that eggs can be shipped by mail satisfactorily under the existing postal provisions, provided these are rigorously observed. * * *

"It is quite possible that once having secured a parcel post market for eggs, many farmers having other commodities not readily salable at home may open up markets for them in the same way. Methods of arriving at prices would be the same, the producer advising the consumer as to the commodities—quantity and price. By this means a market may be found for many products which are not now being marketed, mainly for the reason that they are in the nature of by-products or small surpluses over the family's need which do not justify a special trip to market.

"In addition to such things as may be by-products or surpluses over the family's need, there is quite a field of opportunity open for development in making a special effort to produce such things as town or city residents are anxious to obtain, and by proper attention quite a supplemental income could be built up by developing such business."

With Vermont's nearness to large city markets, the possibilities for working up a lucrative trade through a system of direct marketing, are very attractive.

The Vermont Commissioner of Agriculture has employed a man to do market investigational work and has given much attention to this matter, issuing a bulletin dealing with the subject.

MISCELLANEOUS.

Vermont is a healthful state. The air is pure and invigorating, the water supplies are exceptionally good, and owing to its

elevation, the state is remarkably free, from unhealthful natural conditions. Deaths from typhoid decreased in Vermont between the years 1885 and 1909, 57.7 per cent, compared with the preceding twenty-five-year period. Deaths from tubercular diseases decreased 31.6 per cent from 1885 to 1909, compared with the period from 1860 to 1884. Fatal cases of diphtheria are very rare in Vermont.

In the matter of education Vermont leads all states of the Union in the record of school attendance, with 927 children out of every thousand in public or private schools, according to a recent report made by the division of education of the Russell Sage Foundation. Vermont's rank among the forty-eight states is twelfth in educational advancement. For each \$100 in wealth, Vermont spends 40 cents for education, ranking ninth in this respect. In accordance with the educational laws recently adopted, special attention will be given to the development and maintenance of rural schools, through additional state aid for teachers, and the establishment of such schools wherever the number of children warrants.

A considerable industry in some of the mountain towns of Bennington and Windham counties is the picking of ferns for use of florists in large cities. One company with headquarters at Wilmington pays out from \$12,000 to \$15,000 in a single season. Sometimes hundreds of persons are employed for a few months during the summer and early fall in the picking of ferns. There are several branch receiving stations where the plants are delivered and then they are transferred to receiving and packing rooms where there is a large refrigerating plant. The fern is a crop that never fails and use is thus being made of a plant which flourishes enormously in many mountain regions and until recently has been of no financial benefit to the people of Vermont. A few years ago more than \$20,000 was paid out for the gathering of wild ferns in several Bennington county towns during the months of September, October and November. This business is increasing in importance and it seems probable that this Vermont industry may be developed to a still greater extent. Ginseng, used in some countries as a medicinal plant, is cultivated in some parts of Vermont.

It is possible for farmers who desire to take summer boarders, to make considerable money by so doing, and many hill farms may provide sites for summer homes to good advantage.

With the vast amount of available water power in the state it is possible to develop electricity at comparatively small cost. Already some farmers are lighting their houses and barns with electricity and are using electric power to run ensilage cutters and washing machines, operate churns, and for a great variety of purposes. This use of electricity is likely to become more general in small communities as well as in cities and villages, thus

adding materially to the comforts and conveniences of rural life.

There are about 200 granges in the state, with a total membership of nearly 20,000. Vermont ranks second among the thirty-two grange states, taking population into account.

SOME EXAMPLES OF VERMONT FARMING.

A few examples of successful Vermont farming are given herewith. They are chosen at random and many others equally as good, and perhaps much better, might be secured.

Luke Fisher of Cabot, now a retired farmer, took his father's farm, underdrained the wet, soggy portions, cultivated the land so successfully that it produced five times as much as it did when he commenced in 1869, established a fine dairy, and demonstrated what can be done with what looks at the start like an unpromising Vermont farm.

W. B. Wheelock of Colchester, after working several years in a creamery, bought a small farm and put on ten cows. In order to bring the cattle through the first winter he had to buy \$134 worth of hay. He read with care and profit the bulletins of the Vermont Experiment Station and put in practice, so far as possible, modern scientific methods. In a few years he was able to winter twenty head of cattle and a horse and is now getting into thoroughbred stock.

C. J. Barbour of Bridport, a rural letter carrier, within the past few years has purchased two farms, one of two hundred acres and the other of three hundred acres. The first he rents and the second he has stocked with young cattle and manages it himself. Not long ago he sold thirty-three three-year-old steers grown on the farm, for \$55 each. He writes as follows: "I would say to the young man who is thirty, temperate in all things and willing to work, you need not be afraid to buy a farm right here in Vermont at the present price of real estate, even though you are obliged to mortgage the same for two-thirds of the purchase price."

A few years ago the late Dr. T. R. Waugh of St. Albans purchased Rivernook Farm in Highgate, containing 400 acres, for which he paid \$25,000. He erected an immense 16-sided barn, 100 feet in diameter and in the center of the barn is a silo 19 feet in diameter and 40 feet high. There are 300 acres in one meadow. This meadow is a mile wide and one and one-half miles long, one of the longest in New England. It is overflowed every spring by the Missisquoi river. This farm produces 30 bushels of wheat to the acre, and in 1910, 29 acres produced 4,200 bushels of corn, some of which won prizes at the New England Corn Show.

A letter from J. N. Barss, superintendent of the Vermont State Industrial School at Vergennes, describing farming opera-

tions at that institution, may be of interest. Mr. Barss says: "Replying to your inquiry of May 9th I would say that unfortunately for us with our large family and the necessity of garden truck, our farm is almost entirely stiff, heavy clay. From personal experience we cannot report as favorably as we would like along many lines. We have tried some experiments with different kinds of grain, have raised for several different years from 40 to 42 bushels of wheat per acre, approximately 45 bushels of oats per acre, 50 bushels of oats and barley per acre, and about 60 bushels of spelts per acre. For three successive years our field corn averaged from 70 to 85 bushels of ears per acre.

"We are able to grow hay in almost any quantity. With an experience over a large section of eastern Canada and most of New England I have seen on several occasions hay crops on this farm beyond anything I have seen anywhere. The latter part of June, 1912, I was visited by a man with forty years' experience in agriculture, who was just finishing a trip covering a large part of eastern Canada and part of New England. I drove him through the fields on this farm and to my surprise he told me he had never seen as heavy crops of hay as I had showed him that day.

"You must remember that we are not hay growers nor grain growers and that no one feature of agriculture can exclusively occupy our attention, as our business is the reformation of boys. We have gone far enough, however, in our experiments here to convince us that it would be difficult indeed to find a country where the same amount of capital, labor and intelligence would produce greater results than in this section of Vermont.

"The results with our dairy are crippled by the fact that most of the boys who go out from here must go on farms and it is absolutely necessary that they should be milkers, therefore we have to break in many milkers which is a decided detriment to our herd. Even with this handicap our dairy shows a good profit with the money and time invested.

"Having spent the earlier part of my life in the far-famed fruit region of the Annapolis valley of Nova Scotia, and having spent many winters in packing and shipping fruit, my attention is forcibly called to the possibility of apple growing in this state. We have heard much of late of the perfect condition for fruit growing on the Hero islands. Undoubtedly the conditions there are ideal, but my observation leads me to believe that there is no better fruit growing country in America than the foothills of our Vermont mountains. I believe that where the Champlain valley rises onto higher ground the slopes of the entire lengths of this valley would prove almost ideal for fruit culture. I am thoroughly convinced that there are as good agricultural opportunities for the young man in Vermont as anywhere in America

today, and I believe that for the average young man the openings in agriculture are better than in any other vocation."

Mrs. Carrie J. Nelson-Shackford of East Ryegate was left a widow with a large family. By good management she paid off the mortgage and made a great success of her farm. During the last twenty years she has taken \$547.42 in prizes on her butter. Dairying is the principle business of the farm, from fifty to sixty cattle being kept. High grade Jerseys constitute the herd.

In 1885, A. A. Dunklee of Vernon rented his father's farm of 100 acres and two years later he bought it for \$3,700, giving a mortgage for the entire amount. When he began farming operations the place supported four cows, twenty sheep and one horse. Today the place supports ninety milch cows and enough young stock to bring the number up to one hundred twenty-five, seven horses and about sixty hogs. Mr. Dunklee specializes in the sale of cream and this averages probably \$10,000 a year. The average returns from the herd in recent years have been equal to 350 to 380 pounds of butter each. There are four large silos on the place. Considerable sweet corn is grown for canning purposes, also cucumbers for a pickle factory.

The late T. G. Bronson of Hardwick was one of the leading dairy farmers of Vermont. At the Vermont State Fair 1908 this farm won a special \$150 cup offered for the best Jersey cow in the state. In 1909 this farm won another special cup at the Vermont State Fair for the best cow shown with two of her progeny and subject to a twenty-four hour butter fat test. The same year this herd won six champions and a total of thirty-four out of a possible thirty-five first premiums.

A few Lamoille county illustrations have been furnished where it was desired that names should not be used. A-B bought an \$8,000 farm about twenty years ago and had only a little money he had earned by working several years for the owner. He married a good wife and has raised a large family of children. He has paid for the farm and for several years has had money in the bank. The value of the farm is probably \$12,000.

H-C worked by the day until he was forty years old. He bought a \$3,000 farm on credit and had other debts at the time. The farm, stock and tools are now paid for and the property is worth from \$4,000 to \$5,000.

F-B bought a \$5,000 farm and had only a little money to pay toward stock. In ten years he had paid for the place and now milks forty cows and has a milking machine and other modern improvements.

E-F has a farm and stock which he has paid for with a little help in a few years.

G-A has a farm and stock worth nearly \$10,000, has money in the bank and is in independent circumstances. He started with \$2,000 capital.

The Ox Bow farm in Newbury, on the Connecticut river, owned by Richard F. Darling, is called one of the best in the state. It consists of three separate meadows, two home pastures, and one large pasture several miles away on the hill. The Ox Bow meadow contains 130 acres; the Kimball meadow contains 165 acres, and a third meadow contains 40 acres. The three pastures contained, in the aggregate, 290 acres. The meadows are flooded every spring by the Connecticut river. The lower parts of the meadows yield from three to five tons to the acre of stock hay in two cuttings. Silos are used, not only for winter feeding, but to supplement the pastures in the summer. A yield of fifty or sixty bushels of oats to the acre is not unusual. Holstein cattle are kept on the farm. Mr. Darling closes his letter as follows: "Farming on a good farm, while it is hard work, is certainly profitable and as the farm gains fertility, and we get better cattle, just so much more will be our income of health, wealth and happiness."

The Billings farm at Woodstock is one of the best known farms of the state. Its former manager, James D. Aitken wrote as follows: "Last season all our crops were raised from stable manure alone, no commercial manures being used. We plow all our land in the fall, turning under a liberal amount of well rotted manure. In spring we plow again and thoroughly harrow.

"Our regular crops are hay, corn, oats and potatoes, and in addition we raise quite a lot of mangles, some turnips and carrots. Last season we had in addition three acres of winter wheat, which averaged forty-three bushels per acre. Our corn acreage last year was less than usual, thirty acres, but generally we have from forty to fifty acres. From the thirty acres we husked 3,201 bushel baskets of sound mill corn. Potatoes usually are about two acres, and from the two acres last fall we had 534 bushels.

"Three acres of mangols averaged thirty-two tons per acre. Oats last year averaged forty-four and one-half bushels per acre. We are great believers in stable manures, so much so that in order to have stock enough to consume our hay and roughage and not to sell the same off the farm, we bought in August, 1911, a carload of yearling beef steers in Chicago. On arrival they were turned out to pasture and ran until fall, then yarded and fed the hay and roughage, all they would eat, no grain. In the spring of 1912 they were again pastured until fall, then taken up and fed to fatten, sold in January and February of 1913, and we know at a profit. They were fat, handsome two-year-old beef and brought the top price. They made us lots of manure and we are so well pleased with the experiment that this past August we bought seventy-five head more. These will undergo the same treatment. This followed up will increase our fertilizing and will perhaps increase the average yield of crops. Too much Vermont cash goes out of the state for commercial

manures, and too much hay is baled and shipped out. We run a dairy of from twenty to twenty-five cows, but this and the natural increase does not begin to use up the forage crops."

The Fillmore farms at Bennington, are owned by J. C. Colgate, a prominent New York business man. Mr. Colgate spends his summers here, makes frequent visits during the winter, and maintains his voting residence here. A specialty is made of Horned Dorset sheep and Jersey cattle. The sheep have been prize winners all over the country for the past dozen years. This farm is run on a business basis, every part of it being carefully systematized and books are kept covering the receipts and expenses of every department.

Edward H. Everett was brought up in Bennington, remaining there until he grew to manhood, when he went to Newark, Ohio, where he made a fortune in the glass business. Returning a few years ago, he purchased a string of farms extending from Town hill in Bennington nearly to North Pownal. On the farms Mr. Everett has purchased he has set out orchards aggregating 35,000 trees. Of this number 20,000 are apple trees, and the remainder pear, cherry and plum trees.

THE ANSWER TO THE QUESTION.

This book opened with the question, "What inducements can Vermont offer to an ambitious, wideawake farmer to settle in the Green Mountain state?". The portion of the book following this question is devoted almost entirely to an attempt to answer it. Whether the question has been answered satisfactorily or unsatisfactorily, whether the showing made for the state on the basis of facts given, is good, bad or indifferent, are matters which must be left to the judgment of the individual reader.

If exceptional fertility of soil, comparative cheapness of good farm lands and proximity to the best markets may be considered legitimately as inducements offered to wideawake farmers, then Vermont has much that should be of interest to that very desirable class of citizens. The fertility of the soil of this state is shown by the reports of crop yields made by the United States government, covering a period of more than forty years, which prove that very few states in the Union equal Vermont in the average yield per acre of staple crops, or in the average price received for the same. Only a rudimentary knowledge of geography is required to demonstrate Vermont's proximity to the markets of the big cities. A little investigation will show that prices of farm lands in this state are low when compared with prices in many of the larger agricultural states.

The large crop yields, the comparatively low price of farm lands, the nearness to markets, together with the great agricultural opportunities which the state affords, certainly furnish in-

ducements that no prospective purchaser of a farm can afford to ignore. There is money to be made, as well as comfort to be enjoyed, in farming in Vermont.

AGRICULTURAL PUBLICATIONS.

The following lists of free publications bearing relationship to Vermont agricultural operations may be of service to those who contemplate farming operations within her borders. They may be obtained if in print for the asking. Care should be taken to write to the proper place for several lists are cited.

The list on pages 115 to 134 inclusive comprises Farmers Bulletins and other publications of the United States Department of Agriculture and should be secured by number and name of one's congressman or direct from the department, addressing Division of Publications, United States Department of Agriculture, Washington, D. C.

1. AGRONOMY.

(Including Soils, Fertilizers, Field Crops, and Crop Pests.)

Farmers' Bulletin Number.

- 35. Potato Culture. Pp. 24, figs. 2.
- 164. Rape as a Forage Crop. Pp. 16, fig. 1.
- 192. Barnyard Manure. Pp. 32, figs. 4.
- 224. Canadian Field Peas. Pp. 16, figs. 4.
- 229. The Production of Good Seed Corn. Pp. 23, figs. 10.
- 245. The Renovation of Worn-out Soils. Pp. 16.
- 250. The Prevention of Stinking Smut of Wheat and Loose Smut of Oats. Pp. 16, figs. 7.
- 253. The Germination of Seed Corn. Pp. 16, figs. 4.
- 257. Soil Fertility. Pp. 40, figs. 2.
- 266. Management of Soils to Conserve Moisture. Pp. 30, figs. 7.
- 289. Beans. Pp. 28, figs. 12. (North.)
- 313. Harvesting and Storing Corn. Pp. 29, figs. 17.
- 339. Alfalfa. Pp. 48, figs. 14.
- 362. Conditions Affecting the Value of Market Hay. Pp. 29, figs. 7.
- 372. Soy Beans. Pp. 26, figs. 6.
- 406. Soil Conservation. Pp. 15.
- 410. Potato Culls as a Source of Industrial Alcohol. Pp. 40, figs. 10.
- 414. Corn Cultivation. Pp. 32, figs. 25.
- 415. Seed Corn. Pp. 12, figs. 23.
- 420. Oats: Distribution and Uses. Pp. 24, figs. 4.
- 421. Control of Blowing Soils. Pp. 23, figs. 10.
- 424. Oats: Growing the Crop. Pp. 44, figs. 13.
- 428. Testing Farm Seeds in the Home and in the Rural School. Pp. 47, figs. 32.

- 443. Barley: Growing the Crop. Pp. 48, figs. 17.
- 455. Red Clover. Pp. 48, figs. 25.
- 464. The Eradication of Quack Grass. Pp. 11, figs. 6.
- 485. Sweet Clover.
- 507. The Smuts of Wheat, Oats, Barley and Corn.
- 508. Market Hay.
- 515. Vetches.
- 518. Winter Barley.
- 523. Tobacco Curing.

Agricultural Yearbook Number.

- 537. How to Grow an Acre of Corn. Pp. 21, fig. 12.
- 553. Pop Corn for the Home. Pp. 13, fig. 9.
- 554. Pop Corn for the Market. Pp. 16, fig. 12.
- 556. The Making and Feeding of Silage. Pp. 23, fig. 6.
- 568. Sugar-beet Growing under Humid Conditions. Pp. 20, fig. 4.
- 571. Tobacco Culture. Pp. 15, fig. 4.
- 588. Economical Cattle Feeding in the Corn Belt. Pp. 19, fig. 6.
- 596. The Culture of Winter Wheat in the Eastern United States. Pp. 12, fig. 2.
- 605. Sudan Grass as a Forage Crop. Pp. 20, fig. 10.
- 612. Breeds of Beef Cattle. Pp. 23, fig. 18.
- 616. Winter Wheat Varieties for the Eastern United States. Pp. 14, fig. 6.
- 617. School Lessons on Corn. Pp. 15, fig. 5.
- 619. Breeds of Draft Horses. Pp. 16, fig. 10.
- 622. Basket Willow Culture. Pp. 34, fig. 24.
- 636. The Chalcis-fly in Alfalfa Seed. Pp. 10, fig. 10.
- 637. The Grasshopper Problem and Alfalfa Culture. Pp. 10, fig. 8.
- 640. The Hessian Fly. Pp. 20, fig. 17.
- 649. Alfalfa Attacked by the Clover-root Curculio. Pp. 8, fig. 6.
- 657. The Chinch Bug. Pp. 28, fig. 9.
- 660. Weeds. How to Control Them. Pp. 29, fig. 27.
- 687. Eradication of Ferns from Pasture Lands in the Eastern United States. Pp. 12, fig. 8.
- 690. The Field Pea as a Forage Crop. Pp. 24, fig. 16.
- 691. Grasshoppers and their Control on Sugar Beets and Truck Crops. Pp. 16, fig. 11.
- 456. Cropping System for Stock Farms. Pp. 14. (1907.)
- 488. Some Things that the Grower of Cereals and Forage Crops Should Know About Insects. Pp. 22, pls. 3, figs. 17. (1908.)
- 494. The Development of Farm Crops Resistant to Disease. Pp. 10, pls. 2. (1908.)

495. Soil Mulches for Checking Evaporation. Pp. 8, figs. 7.
(1908.)
507. The Function and Value of Soil Bacteria. Pp. 7, figs. 2.
(1909.)
530. Nitrogen-Gathering Plants. Pp. 8, pls. 8. (1910.)
357. Insect enemies of Tobacco in the United States. Pp. 20,
pl. 1, figs. 13. (1910.)

2. HORTICULTURE.

Farmers' Bulletin Number.

61. Asparagus Culture. Pp. 40, figs. 17.
113. (Rev.) The Apple and How to Grow It. Pp. 32, figs. 10.
154. The Home Fruit Garden: Preparation and Care. Pp. 16,
figs. 6.
156. The Home Vineyard with Special Reference to Northern
Conditions. Pp. 22, figs. 15.
157. The Propagation of Plants. Pp. 24, figs. 22.
176. Cranberry Culture. Pp. 20, figs. 12.
181. Pruning. Pp. 39, figs. 25.
185. Beautifying the Home Grounds. Pp. 24, figs. 8.
195. Annual Flowering Plants. Pp. 48, figs. 55.
198. Strawberries. Pp. 24, figs. 15.
213. Raspberries. Pp. 38, figs. 25.
220. Tomatoes. Pp. 32, figs. 13.
231. Spraying for Cucumber and Melon Diseases. Pp. 24,
figs. 8.
243. Fungicides and Their Use in Preventing Diseases of Fruits.
Pp. 32, figs. 17.
248. The Lawn. Pp. 20, figs. 5.
254. Cucumbers. Pp. 30, figs. 14.
255. The Home Vegetable Garden. Pp. 47, figs. 34.
282. Celery. Pp. 36, figs. 16.
283. Spraying for Apple Diseases and the Codling Moth in the
Ozarks. Pp. 42, figs. 7.
284. Insect and Fungus Enemies of the Grape East of the Rocky
Mountains. Pp. 48, figs. 35.
354. Onion Culture. Pp. 36, figs. 20.
407. The Potato as a Truck Crop. Pp. 24.
433. Cabbage. Pp. 23, figs. 11.
434. The Home Production of Onion Seed and Sets. Pp. 24,
figs. 12.
440. Spraying Peaches for the Control of Brown-rot, Scab and
Curculio. Pp. 40, figs. 14.
453. Danger of General Spread of the Gipsy and Brown Tail
Moths Through Imported Nursery Stock. Pp. 22,
figs. 7.
460. Frames as a Factor in Truck Growing. Pp. 29, figs. 12.

- 482. The Pear and How to Grow It.
- 488. Diseases of Cabbage and Related Crops and Their Control.
- 491. The Profitable Management of the small Apple Orchard on the General Farm.
- 492. The More Important Insect and Fungous Enemies of the Fruit and Foliage of the Apple.
- 494. Lawns and Lawn Soils.
- 521. Canning Tomatoes at Home and in Club Work.
- 533. Good Seed Potatoes and How to Produce Them. Pp. 16, fig. 8.
- 544. Potato-tuber Diseases. Pp. 16, fig. 16.
- 631. Growing Peaches: Sites, Propagation, Planting, Tillage and Maintenance of Soil Fertility. Pp. 24, fig. 8.
- 632. Growing Peaches: Pruning, Renewal of Tops, Thinning Interplanted Crops and Special Practices. Pp. 23, fig. 19.
- 633. Growing Peaches: Varieties and Classification. Pp. 13.
- 643. Blackberry Culture. Pp. 13, fig. 8.
- 644. Manufacture and Use of Unfermented Grape Juice. Pp. 16, fig. 14.
- 650. The San Jose Scale and its Control. Pp. 27, fig. 17.
- 662. The Apple-tree Tent Caterpillar. Pp. 10, fig. 7.
- 668. The Squash-vine Borer. Pp. 6, fig. 2.
- 675. The Round-headed Apple-tree Borer. Pp. 20, fig. 19.

Agricultural Yearbook Reprint Number.

- 47. Small-fruit Culture for Market. Pp. 12, pl. 1. (1895.)
- 197. How Birds Affect the Orchard. Pp. 14, figs. 5. (1900.)
- 261. The San Jose Scale: Its Native Home and Natural Enemy. Pp. 20, pls. 6, figs. 3. (1902.)
- 266. Top Working Orchard Trees. Pp. 14, pls. 4, figs. 8. (1902.)
- 293. The Cultivation and Fertilization of Peach Orchards. Pp. 20, pls. 6. (1902.)
- 386. The Principal Insect Enemies of the Peach. Pp. 24, pls. 7, figs. 7. (1905.)
- 387. The Handling of Fruit for Transportation. Pp. 14, pls. 4. (1905.)
- 388. Meadow Mice in Relation to Agriculture and Horticulture. Pp. 14, pls. 4, fig. 1. (1905.)
- 433. Lime-sulphur Washes for the San Jose Scale. Pp. 18. (1906.)
- 480. Information about Spraying for Orchard Insects. Pp. 22, pls. 5. (1908.)
- 504. Plants Useful to Attract Birds and Protect Fruit. Pp. 11. (1909.)
- 519. Prevention of Frost Injury to Fruit Crops. Pp. 7, pl. 1, fig. 1. (1909.)
- 546. Cooperation in the Marketing and Handling of Fruit. Pp. 20. (1910.)

3. FORESTRY.

Farmers' Bulletin Number.

- 99. Three Insect Enemies of Shade Trees. Pp. 30, figs. 11.
- 173. A Primer of Forestry. Part I: The Forest. Pp. 48, figs. 33.
- 228. Forest Planting and Farm Management. Pp. 22, figs. 3.
- 358. A Primer of Forestry. Part II: Practical Forestry. Pp. 48, figs. 25. (See also Bulletin 276 in the list under Experiment Station Work, p. 23.)
- 468. Forestry in Nature Study. Pp. 43, figs. 13.
- 582. Uses for Chestnut Timber Killed by the Bark Disease. Pp. 24, fig. 8.

Forest Service Circular Number.

- 25. Forestry and the Lumber Supply. Pp. 14.
- 61. (Rev.) How to Transplant Forest Trees. Pp. 4.
- 69. Forest Planting Leaflet. Pp. 4.
- 140. What Forestry Has Done. Pp. 32.
- 157. A Primer of Conservation. Pp. 24.
- 165. Practical Assistance to Owners of Forest Lands and to Tree Planters. Pp. 7.
- 166. The Timber Supply of the United States. Pp. 24, figs. 6.
- 167. The Status of Forestry. Pp. 29.
- 171. The Forests of the United States: Their Use. Pp. 25.
- 180. Lumber Saved by using Odd Lengths. Pp. 5.

Agricultural Yearbook Reprint Number.

- 112. Trees of the United States Important in Forestry. Pp. 26. (1897.)
- 268. Some of the Principal Insect Enemies of Coniferous Forests in the United States. Pp. 18, pls. 2, figs. 10. (1902.)
- 270. Practicability of Forest Planting in the United States. Pp. 12, pls. 4. (1902.)
- 274. Influence of Forestry upon the Lumber Industry. Pp. 3, pls. 3. (1902.)
- 327. Insect Injuries to Hardwood Forest Trees. Pp. 16, figs. 17. (1903.)
- 329. The Relation of Forests to Stream Flow. Pp. 10. (1903.)
- 355. Insect Injuries to Forest Products. Pp. 18, figs. 14. (1904.)
- 376. How to Grow Young Trees for Forest Planting. Pp. 10, pls. 1, fig. 1. (1905.)
- 381. Insect Enemies of Forest Reproduction. Pp. 8, figs. 9. (1905.)
- 434. National Forests and the Lumber Supply. Pp. 6. (1906.)
- 442. Notable Depredations by Forest Insects. Pp. 16. (1907.)
- 523. Injuries to Forest Trees by Flat-headed Borers. Pp. 6, figs. 12. (1909.)

525. The management of Second-growth Sprout Forests. Pp. 16, pls. 2. (1910.)
 534. Progress in Saving Forest Waste. Pp. 16, pls. 3. (1910.)
 542. Injuries to Forests and Forest Products by Round-headed Borers. Pp. 20, figs. 12. (1910.)
 548. Fire Prevention and Control in the National Forests. Pp. 16, pls. 6. (1910.)

Circulars dealing with the more important forest trees may be had by writing the Forest Service, U. S. Department of Agriculture, Washington, D. C.

1. FARM ANIMALS.

Farmers' Bulletin Number.

- 22 (Rev.) The Feeding of Farm Animals. Pp. 40.
 49. Sheep Feeding. Pp. 24.
 71. Essentials in Beef Production. Pp. 24, figs. 17.
 96. Raising Sheep for Mutton. Pp. 48, figs. 18.
 170. Principles of Horse Feeding. Pp. 44.
 205. (Rev.) Pig Management. Pp. 40, figs. 22.
 206. Milk Fever and Its Treatment. Pp. 16, figs. 2.
 346. The Computation of Rations for Farm Animals by the Use of Energy Values. Pp. 32.
 350. The Dehorning of Cattle. Pp. 14, figs. 6.
 351. The Tuberculin Test of Cattle for Tuberculosis. Pp. 8.
 379. Hog Cholera. Pp. 23, figs. 3.
 438. Hog Houses. Pp. 25, figs. 21.
 439. Anthrax with Special Reference to Its Suppression. Pp. 16.
 573. The Angora Goat. Pp. 16, fig. 6.
 576. Breeds of Sheep for the Farm. Pp. 16, fig. 10.
 652. The Sheep-killing Dog. Pp. 13, fig. 3.
 655. Cottonseed Meal for Feeding Beef Cattle. Pp. 8.
 666. Foot and Mouth Disease. Pp. 16, fig. 7.
 667. Breaking and Training Colts. Pp. 16, fig. 11.
 683. Fleas as Pests to Man and Animals, with Suggestions for their Control. Pp. 15, fig. 6.
 695. Outdoor Wintering of Bees. Pp. 12.

Bureau of Animal Industry Circular Number.

23. (3. Rev.) Directions for the Use of Blackleg Vaccine Pp. 8, figs. 3.
 31. (3. Rev.) Blackleg: Its Nature, Cause and Prevention. Pp. 24, fig. 1.
 63. A Review of Some Experimental Work in Pig Feeding. Pp. 49.
 68. (Rev.) Diseases of the Stomach and Bowels of Cattle. Pp. 10.
 78. Glanders and Farcy. Pp. 12.

89. The Preparation of Emulsions of Crude Petroleum (for cattle parasites). Pp. 4.
 94. Foot Rot of Sheep. Pp. 20, fig. 1.
 102. Stomach Worms in Sheep. Pp. 7.
 105. Baby Beef. Pp. 105, pl. 1, figs. 5.
 113. Classification of American Carriage Horses. Pp. 4.
 137. The Preservation of Our Native Types of Horses. Pp. 59, pl. 1, figs. 19.
 141. Foot-and-mouth Disease. Pp. 8.
 144. Tuberculosis of Hogs: Its Cause and Suppression. Pp. 32, pls. 4.
 157. The Prevention of Losses among Sheep from Stomach Worms. Pp. 10.
 163. The Regeneration of the Morgan Horse. Pp. 14, figs. 2.
 165. Methods for the Eradication of Gid. Pp. 29, figs. 14.
 175. The Control of Bovine Tuberculosis. Pp. 27.
 178. Breeding Horses for the United States Army. Pp. 13.
- Bureau of Entomology Circulars.
15. The Horn Fly. Pp. 13, figs. 6.

Agricultural Yearbook Reprint Number.

15. Some Practical Suggestions for the Suppression and Prevention of Bovine Tuberculosis. Pp. 14. (1894.)
456. Cropping System for Stock Farms. Pp. 14. (1907.)
484. Recent Work of the Bureau of Animal Industry Concerning the Cause and Prevention of Hog Cholera. Pp. 12. (1908.)

See also Bulletins 107, 119, 144, 222, 225, 244, 251, 273, 316, 366, 381 and 451 in the list under Experiment Station Work.

2. POULTRY.

Farmers' Bulletin Number.

51. (Rev.) Standard Varieties of Chickens. Pp. 48, figs. 42.
64. (Rev.) Ducks and Geese. Pp. 55, figs. 37.
177. (Rev.) Squab Raising. Pp. 32, figs. 11.
200. Turkeys. Pp. 40, figs. 12.
234. The Guinea Fowl. Pp. 24, figs. 3.
236. Incubation and Incubators. Pp. 32, figs. 11.
287. Poultry Management. Pp. 48, figs. 14.
355. A Successful Poultry and Dairy Farm. Pp. 40, figs. 7.
357. Methods of Poultry Management at the Maine Agricultural Experiment Station. Pp. 39, figs. 10.
445. Marketing Eggs through the Creamery. Pp. 12.
528. Hints to Poultry Raisers. Pp. 12, fig. 2.
530. Important Poultry Diseases. Pp. 36.
585. Natural and Artificial Incubation of Hens' Eggs. Pp. 16, fig. 3.

- 594. Shipping Eggs by Parcel Post. Pp. 20, fig. 6.
- 624. Natural and Artificial Brooding of Chickens. Pp. 14, fig. 10.
- 656. The Community Egg Circle. Pp. 7.
- 682. A Single Trap Nest for Poultry. Pp. 3, fig. 2.
- 684. Squab Raising. Pp. 16, fig. 9.
- 697. Duck Raising. Pp. 23, fig. 13.

See also many of the bulletins in the list under Experiment Station Work.

1. DAIRYING.

Farmers' Bulletin Number.

- 55. (Rev.) The Dairy Herd. Pp. 30.
- 106. Breeds of Dairy Cattle. Pp. 48, figs. 21.
- 166. Cheese Making on the Farm. Pp. 16, figs. 3.
- 201. The Cream Separator on Western Farms. Pp. 23.
- 280. A Profitable Tenant Dairy Farm. Pp. 16, figs. 3.
- 337. Cropping Systems for New England Dairy Farms. Pp. 24, figs. 2.
- 355. A Successful Poultry and Dairy Farm. Pp. 40, figs. 7.
- 413. The Care of Milk and Its Use in the Home. Pp. 20.
- 445. Marketing Eggs Through the Creamery. Pp. 12.
- 487. Cheese and Its Economical Uses in the Diet.
- 490. Bacteria in Milk.
- 541. Farm Butter Making. Pp. 28, fig. 15.
- 578. The Making and Feeding of Silage. Pp. 24, fig. 6.
- 602. Production of Clean Milk. Pp. 18, fig. 6.
- 608. Removal of Garlic Flavor from Milk and Cream. Pp. 4, fig. 1.
- 623. Ice Houses and the Use of Ice on the Dairy Farm. Pp. 24, fig. 10 b.
- 689. A Plan for a Small Dairy House. Pp. 4, fig. 4.

Bureau of Animal Industry Circular Number.

- 118. The Unsuspected but Dangerously Tuberculous Cow. Pp. 19, figs. 7.
- 126. A Simple Method of Keeping Creamery Records. Pp. 12.
- 130. Paraffining Butter Tubs. Pp. 6, fig. 1.
- 142. Some Important Factors in the Production of Sanitary Milk. Pp. 18, figs. 12.
- 143. Milk and Its Products as Carriers of Tuberculosis Infection. Pp. 7.
- 153. The Dissemination of Disease by Dairy Products. Pp. 57, figs. 11.
- 158. Improved Methods for the Production of Market Milk by Ordinary Dairies. Pp. 12, figs. 11.
- 161. Whey Butter. Pp. 7.

166. The Digestibility of Cheese. Pp. 22.
 170. The Extra Cost of Producing Clean Milk. Pp. 12, pls. 4, fig. 1.
 175. The Control of Bovine Tuberculosis. Pp. 27.
 Agricultural Yearbook Reprint Number.
 94. Utilization of By-products of the Dairy. Pp. 20. (1897.)
 260. Dairying at Home and Abroad. Pp. 10, pls. 6. (1902.)
 532. The Eradication of Cattle Tuberculosis in the District of Columbia. Pp. 16. (1910.)
 536. The Grading of Cream. Pp. 8. (1910.)

2. MISCELLANEOUS.

Farmers' Bulletin Number.

36. Cotton Seed and Its Products. Pp. 16.
 252. Maple Sugar and Syrup. Pp. 36, figs. 9. (North.)
 268. Industrial Alcohol: Sources and Manufacture. Pp. 45, figs. 10.
 410. Potato Culls as a source of Industrial Alcohol. Pp. 40, figs. 10.

1. FARM BUILDINGS.

Farmers' Bulletin Number.

32. (Rev.) Silos and Silage. Pp. 30, figs. 6.
 126. Practical Suggestions for Farm Buildings. Pp. 48, figs. 28.
 270. Modern Conveniences for the Farm Home. Pp. 48, figs. 26.
 367. Lightning and Lightning Conductors. Pp. 20, figs. 3.
 438. Hog Houses. Pp. 29, figs. 21.
 475. Ice Houses.
 480. Practical Methods of Disinfecting Stables.
 574. Poultry House Construction. Pp. 20, fig. 13. .
 589. Homemade Silos. Pp. 47, fig. 37.
 623. Ice Houses and the Use of Ice on the Dairy Farm. Pp. 24, fig. 10b.

Bureau of Animal Industry Circular Number.

131. Designs for Dairy Buildings. Pp. 26, figs. 32.
 136. How to Build a Stave Silo. Pp. 18, figs. 18.

Forest Service Circular Number.

180. Lumber Saved by Using Odd Lengths. Pp. 5.

See also Bulletins 119 and 124 in the list under Experiment Station Work.

See also Bulletins 149, 190, 225, 244 and 317 in the list under Experiment Station Work.

2. FARM MECHANICS.

Farmers' Bulletin Number.

150. Clearing New Land. Pp. 24, figs. 7.
 179. Horseshoeing. Pp. 30, figs. 18.

- 235. Preparation of Cement Concrete. Pp. 32, figs. 4.
- 269. Industrial Alcohol: Uses and Statistics. Pp. 29, figs. 10.
- 277. The Use of Alcohol and Gasoline in Farm Engines. Pp. 40, figs. 12.
- 303. Corn-harvesting Machinery. Pp. 32, figs. 20.
- 347. The Repair of Farm Equipment. Pp. 32, figs. 23.
- 387. Preservative Treatment of Farm Timbers. Pp. 19, figs. 5.
- 403. The Construction of Concrete Fence Posts. Pp. 31, figs. 9.
- 474. The Use of Paint on the Farm. Pp. 21, fig. 1.
- 481. Concrete Construction on the Livestock Farm.

Forest Service Circular Number.

- 69. Fence-post Trees. Pp. 4.
- 142. Tests of Vehicle and Implement Woods. Pp. 29.

Bureau of Plant Industry Circular Number.

- 44. Minor Articles of Farm Equipment. Pp. 15.

Agricultural Yearbook Reprint Number.

- 457. Hygienic Water Supplies for Farms. Pp. 10, pl. 1, figs. 4. (1907.)
- 518. Comforts and Conveniences in Farmers' Homes. Pp. 11, figs. 6. (1909.)

3. ROAD IMPROVEMENT.

Farmers' Bulletin Number.

- 311. Sand-clay and Burnt-clay Roads. Pp. 19, figs. 5.
- 321. The Use of the Split-log Drag on Earth Roads. Pp. 14, figs. 5.
- 338. Macadam Roads. Pp. 39, figs. 10.
- 505. Benefit of Improved Roads.
- 597. The Road Drag and How it is Used. Pp. 15, fig. 8.

Office of Public Roads Circular Number.

- 37. The Railroads and the Wagon Roads. Pp. 4.
- 89. Progress Reports of Experiments with Dust Preventives. Pp. 26.
- 90. Progress Reports of Experiments in Dust Prevention, Road Preservation, and Road Construction. Pp. 23.
- 91. Sand-clay and Earth Roads in the Middle West. Pp. 31, figs. 6.
- 92. Progress Reports of Experiments in Dust Prevention and Road Preservation. Pp. 32.
- 296. Use of Mineral Oil in Road Improvement. Pp. 16, pls. 3, figs. 4.
- 412. Object-lesson Roads. Pp. 10, pls. 4. (1906.)
- 448. Dust Preventives. Pp. 10, pls. 4. (1907.)
- 535. Progress and Present Status of the Good Roads Movement. Pp. 12. (1910.)



A CLOVER FIELD.



A SPRAYED POTATO FIELD.

538. Bituminous Dust Preventives and Road Binders. Pp. 12.
(1910.)

See also Bulletins 149, 353 and 381 in the list under Experiment Station work.

4. DRAINAGE.

Farmers' Bulletin Number.

187. Drainage of Farm Lands. Pp. 38, figs. 19.
524. Tile Drainage on the Farm.
698. Trenching Machinery Used for the Construction of
Trenches for Tile Drains. Pp. 26, fig. 15.

5. IRRIGATION.

Farmers' Bulletin Number.

138. Irrigation in Field and Garden. Pp. 40, figs. 18.
158. How to Build Small Irrigating Ditches. Pp. 28, figs. 9.
Yearbook Reprints.
458. The Use of Small Water Supplies for Irrigation. Pp. 16,
figs. 6.
495. Soil Mulches for Checking Evaporation. Pp. 8, figs. 7.
514. Methods of Applying Water to Crops. Pp. 16, pl. 1, figs.
10.

Farm Management, etc.

Farmers' Bulletin Number.

62. Marketing Farm Produce. Pp. 31, figs. 17.
228. Forest Planting and Farm Management. Pp. 22, figs. 3.
229. The Production of Good Seed Corn. Pp. 23, figs. 10.
242. An Example of Model Farming. Pp. 16, figs. 5.
272. A Successful Hog and Seed Corn Farm. Pp. 16, figs. 5.
280. A Profitable Tenant Dairy Farm. Pp. 16, figs. 3.
319. Demonstration Work in Cooperation with Southern Farm-
ers. Pp. 22.
325. Small Farms in the Corn Belt. Pp. 29, figs. 3.
337. Cropping Systems for New England Dairy Farms. Pp.
24, figs. 2.
355. A Successful Poultry and Dairy Farm. Pp. 40, figs. 7.
362. Conditions affecting the Value of Market Hay. Pp. 29,
figs. 7.
365. Potato Growing in Northern Sections. Pp. 31, figs. 11.
370. Replanning a Farm for Profit. Pp. 36.
432. How a City Family Managed a Farm. Pp. 28, figs. 7.
437. A System of Tenant Farming and Its Results. Pp. 20.
454. A Successful New York Farm. Pp. 32, figs. 9.
460. Frames as a Factor in Truck Growing. Pp. 29, figs. 12.

572. A System of Farm Cost Accounting. Pp. 15.
 661. A Method of Analyzing the Farm Business. Pp. 26.

Bureau of Animal Industry Circular Number.

56. Facts Concerning the History, Commerce, and Manufacture of Butter. Pp. 24.
 103. Records of Dairy Cows: Their Value and Importance in Economic Milk Production. Pp. 38, figs. 10.
 140. The Egg Trade of the United States. Pp. 34, figs. 2.
 178. Breeding Horses for the United States Army. Pp. 13.

Bureau of Plant Industry Circulars.

75. Agricultural Survey of Four Townships in Southern New Hampshire. Pp. 19, figs. 3.

Bureau of Statistics Circulars.

See also Bulletins 114 and 190 in the list under Experiment Station work, pp.

Agricultural Yearbook Reprint Number.

122. Agricultural Production and Prices. Pp. 30. (1897.)
 304. The Nation's Farm Surplus. Pp. 12. (1903.)
 340. Opportunities in Agriculture. Pp. 30, pls. 3. (1904.)
 430. Freight Costs and Market Values. Pp. 16. (1906.)
 443. Does it Pay the Farmer to Protect Birds? Pp. 14, pls. 4. (1907.)
 447. The Value of Insect Parasitism to the American Farmer. Pp. 20, figs. 24. (1907.)
 456. Cropping System for Stock Farms. Pp. 14. (1907.)
 474. The Economic Value of Predaceous Birds and Mammals. Pp. 8, pls. 3. (1908.)
 475. The Wastes of the Farm. Pp. 20. (1908.)
 487. Types of Farming in the United States. Pp. 15. (1908.)
 502. Methods and Costs of Marketing. Pp. 14. (1909.)
 509. Farming as an Occupation for City-bred Men. Pp. 9. (1909.)
 525. The Management of Second Growth Sprout Forest. Pp. 11. (1910.)
 528. Supply and Wages of Farm Labor. Pp. 16. (1910.)
 533. The Game Market of Today. Pp. 16, figs. 2. (1910.)
 546. Cooperation in the Marketing and Handling of Fruit. Pp. 20. (1910.)
 552. The Effect of the Present Method of Handling Eggs on the Industry and the Product. Pp. 20, pl. 1. (1910.)
 553. Agricultural Statistics. Pp. 212. (1910.)
 (Agricultural statistics of crop and animal products are published for each year and may be had on application to the Secretary of Agriculture.)

General and Special Topics.

Farmers' Bulletin Number.

- 54. (Rev.) Some Common Birds. Pp. 48, figs. 22.
- 59. (Rev.) Bee Keeping. Pp. figs. 19.
- 86. Thirty Poisonous Plants. Pp. 32, figs. 24.
- 127. (Rev.) Important Insecticides. Pp. 45, figs. 6.
- 183. Meat on the Farm: Butchering, Curing, and Keeping.
Pp. 37, figs. 35.
- 188. Weeds Used in Medicine. Pp. 45, figs. 31.
- 194. Alfalfa Seed. Pp. 14, figs. 55.
- 196. Usefulness of the American Toad. Pp. 16.
- 315. Progress in Legume Inoculation. Pp. 20.
- 330. Deer Farming in the United States. Pp. 20, figs. 2.
- 369. How to Destroy Rats. Pp. 20, figs. 5.
- 540. The Stable Fly. Pp. 28, fig. 10.
- 543. Common White Grubs. Pp. 20, fig. 12.
- 545. Controlling Canada Thistles. Pp. 14, fig. 6.
- 564. The Gipsy moth and the Brown-tail Moth, with Suggestions for their Control. Pp. 24, fig. 10.
- 583. The Common Mole of the Eastern United States. Pp. 10, fig. 4.
- 587. Economic Value of North American Skunks. Pp. 22, fig. 10.
- 593. How to Use Farm Credit. Pp. 14.
- 594. Shipping Eggs by Parcel Post. Pp. 20, fig. 6.
- 600. An Outfit for Boring Taprooted Stumps for Blasting. Pp. 5, fig. 4.
- 610. Wild Onion: Methods of Eradication. Pp. 8, fig. 7.
- 621. How to Attract Birds in Northeastern United States.
Pp. 15, fig. 11.
- 630. Some Common Birds Useful to the Farmer. Pp. 27, fig. 23.
- 635. What the Farm Contributes Directly to the Farmer's Living. Pp. 21.
- 654. How Farmers May Improve their Personal Credit. Pp. 14.
- 670. Field Mice as Farm and Orchard Pests. Pp. 10, fig. 7.
- 679. House Flies. Pp. 22, fig. 15.
- 703. Suggestions for Parcel Post Marketing. Pp. 19, fig. 8.

Experiment Station Work.

Experiment Station Work is a sub-series of Farmers' Bulletins compiled from the published reports of the agricultural experiment stations and kindred institutions in this and other countries. In sending for bulletins of this series simply ask for Farmers' Bulletins, giving the serial number of the bulletin without specifying the topics treated in it.

78. Humus in soils—Winter protection of peach trees—Sunflowers—Grape juice and Sweet Cider, etc. Pp. 32, figs. 2.
84. Home-mixed fertilizers—Field selection of seed—Potatoes as food—By-product of the dairy—Gape diseases of chickens, etc. Pp. 32, figs. 8.
87. Soil moisture and fertility—Cultivating v. cropping orchards—Transplanting trees—Food value of eggs—The toad as the farmers' friend, etc. Pp. 32, figs. 6.
92. Sugar beets on alkali soils—Replanting corn—Improved culture of potatoes—Second-crop seed potatoes—Pasteurization of milk for butter making, etc. Pp. 30.
105. The tillering of grains—Fertilizers for gardens—Cereal breakfast foods—When to cut alfalfa—Spontaneous combustion of hay, etc. Pp. 32, figs. 4.
107. Fertilizer requirements for crops—Cost of raising calves—Feeding tuberculous milk to calves—Killing the germs of tuberculosis in milk—Dairy salt, etc. Pp. 32, figs. 3.
114. Influence of salt on soil moisture—Extra early potatoes—Low-grade Paris green—Skim milk in bread making—Profitable and unprofitable cows, etc. Pp. 28, figs. 5.
119. Storing apples without ice—Cold storage on the farm—Transplanting muskmelons—Effect of cotton-seed meal on the quality of butter—Protection against Texas fever, etc. Pp. 31, figs. 5.
122. Liming grass lands—Nuts as food—A pure-food law—Selling eggs by weight—Unfermented grape juice, etc. Pp. 32, figs. 5.
124. Distilled drinking water—Lime as a fertilizer—Weed destruction—Maple syrup and sugar—Type of the dairy cow, etc. Pp. 32, figs. 6.
478. How to Prevent Typhoid Fever.
493. The English Sparrow as a Pest.
503. Comb Honey.
511. Farm Bookkeeping.
513. 50 Common Birds of Farm and Orchard.
516. The Production of Maple Syrup and Sugar.
525. Raising Guinea Pigs.
133. Value of stable manure—Alfalfa as a fertilizer—Liming acid soils—Frost-resisting strawberries—Ridding houses of flies, etc. Pp. 32, figs. 14.
144. Maintenance of soil fertility—Rotation of crops—Cattle and poultry foods—An improved cow stall, etc. Pp. 32, figs. 9.
149. Culture of potatoes—Shrinkage of farm products—Soils and fertilizers for strawberries—Shelter for dairy cows—Feed mills and windmills, etc. Pp. 32, figs. 6.

186. Losses in manure—Protection of peach buds—Dandelions in lawns—Rations for laying hens—Keeping quality of butter, etc. Pp. 32, figs. 9.
190. Cost of eggs in winter—Profitable and unprofitable cows—Methods of milking—Coating cheese with paraffin—Ventilation of stables, etc. Pp. 32, figs. 14.
210. Hen manure—Varieties and qualities of wheat—Corn breeding—Injuries to shade trees—Oak leaves as forage—The covered milk pail—Fertilizers for potatoes, etc. Pp. 32, figs. 7.
222. Home mixing of fertilizers—Weight per quart of feeding stuffs—Recent horse-feeding tests—Market classes and grades of swine—Silage in place of grain for dairy cows, etc. Pp. 32, fig. 1.
225. Incompatibles in fertilizer mixtures—Value of flint varieties of corn—Buying and judging seed corn—Potato culture—Influence of feed on milk—Protecting cows from flies—A successful brooder house—Prevention of swelling in canned peas, etc. Pp. 32, figs. 6.
233. Root systems of plants—Mushroom culture—Noodles—Condimental feeds—Beef v. dairy type for beef production—Feeding calves skim milk—Milk from diseased cows—Cider vinegar, etc. Pp. 32, figs. 5.
237. Lime and clover—Plant-food requirements of fruit trees—Running out of seed wheat—Cereal breakfast foods—Damaged wheat as feed—Bedding for cows—Amateur poultry raising—Care of cream on the farm—Yeast as a disinfectant, etc. Pp. 32, figs. 6.
244. Handling seed corn—Adaptation of seed corn—Effect of root nodules on composition of crops—Cooking quality of potatoes—Methods of feeding poultry—Covered yards for cows, etc. Pp. 32, figs. 6.
251. American sugar-beet seed—Profits from spraying potatoes—Durum wheat—Indoor v. outdoor feeding of steers—Cheap dairy rations—Cottonseed meal for hogs, etc. Pp. 32, fig. 1.
259. Use of commercial fertilizers—Spreading lime—Soil sterilization—Weights per bushel of seeds—Disease-resistant crops—Alfalfa meal as a feeding stuff—Milk fever—Nail wounds in horses' feet—Use of a cheap canning outfit, etc. Pp. 32, figs. 3.
267. Breeding corn—Buckwheat—Grass mulch for orchards—Hardiness of young fruit trees—Protecting cows from flies, etc. Pp. 32, fig. 1.
273. Loss of nitrogen from soils—Manure as affected by feed—Continuous corn culture—Pasturing wheat—Rotting of potatoes in storage—Preserving eggs—Testing

- individual cows—Cleanliness in the dairy, etc. Pp. 32, figs. 4.
276. Improvement in peach growing—Alfalfa in the Eastern States—Improvement of grass land—Succotash as a soiling crop—Digestibility of fish and poultry—Honey vinegar—The farm woodlot, etc. Pp. 32, figs. 2.
296. Wells and pure water—Pure seed v. poor seed—Disease-resistant clover—Eradication of wild mustard—Seedless tomatoes—Hay box or fireless cooker—Insect enemies of shade trees, etc. Pp. 32, figs. 4.
305. Renewal of old orchards—Injury by Bordeaux mixture—Roots for farm animals—Cabbage as a stock feed—Cull beans as a feed for hogs—Healthy poultry, etc. Pp. 32.
309. Ice for household uses—Silage from frosted corn—Cooperation in marketing crops—Causes of death of young chicks—Snow for poultry, etc. Pp. 32.
316. Winterkilling of peach buds—Effect of fertilizers on the color of apples—Potato scab—Cooking cereal foods—Supplements to corn in hog feeding—Hoppers for poultry, etc. Pp. 32, figs. 4.
317. Improving the convenience and comfort of the farm home—Cement pipe for irrigation—Increasing the productiveness of corn—Catching hook for poultry, etc. Pp. 32, figs. 6.
329. Low-grade v. high-grade fertilizers—Improvement of sandy soils—Dry farming—Seed selection—Evergreens: Uses and culture—Preparation of miscible oils—Cane sugar and beet sugar, etc. Pp. 32, figs. 4.
334. Plant breeding on the farm—Profits from tomato growing—The keeping of apples—Weed seeds in manure and feeding stuffs—Market classes and grades of horses and mules—Extraction of beeswax, etc. Pp. 32, figs. 2.
342. Conservation of soil resources—Potato breeding—Disk-harrowing alfalfa—The Montreal muskmelon—Storage of Hubbard squash—Preserving wild mushrooms—Cooking beans and other vegetables—A model kitchen, etc. Pp. 32, figs. 3.
353. Commercial clover seed—Growing potatoes under straw—Hens v. incubators—Preparing fowls for market—A cheap and efficient sterilizer—A cheap and efficient ice box—The power laundry on the farm, etc. Pp. 32, figs. 14.
360. Distance between corn hills—Street trees—Spraying for weeds—Market classes and grades of sheep—Hulled corn—Mixing fat into dough, etc. Pp. 32, figs. 6.

366. Treatment of muck soils—Corn breeding—Hook-worm disease in cattle—Effect of machine milking on cows—Milk supply of cities—The crow, etc. Pp. 32.
374. Inoculation and lime for alfalfa—Pruning *ratundifolia* grapes—Native hays of the arid region—Bermuda grass—Short v. long feeding of beef cattle—Feeding work horses—Colony houses for poultry—Flour for baking powder biscuits, etc. Pp. 32, figs. 5.
381. Methods and cost of clearing land—Calf feeding—Gasoline heated colony brooders—Measuring acidity in cheese making and butter making. Pp. 32, figs. 9.
384. Early onions in the Southwest—Oleander poisoning of live stock—Wintering farm work horses—Alfalfa meal as a feeding stuff—Whipped cream—Farm butter making—Cement and concrete fence posts, etc. Pp. 32, figs. 3.
388. Incompatibles in fertilizer mixtures—Principles of dry farming—Methods of seeding oats—Rolling v. harrowing winter wheat—Pruning—Bean anthracnose or pod spot—Jelly and jelly making, etc. Pp. 32, figs. 7.
412. Wart disease of the potato—The typhoid or house fly—The forced molting of fowls—Pasteurization in butter making—Milling and baking tests with durum wheat, etc. Pp. 32, figs. 6.
419. Tillage v. sod mulch in orchards—Ear characters of seed corn—Seed disinfection—Blackleg of the Irish potato—Progress in horse breeding—Sweet potatoes. Pp. 24, figs. 4.
425. Commercial bean growing—Digestion experiments with range forage crops—Substitutes for oats for horses, etc. Pp. 24, figs. 3.
430. Unusual v. standard fertilizers—Symptoms of disease in plants—Condimental feeds—Feeding the dairy calf—Defects in cottage cheese—The Iowa silo. Pp. 24, figs. 14.
435. Water required for crops—Burning lime on the farm—Tomatoes for canning—Lime sulphur as a fungicide—Market classes and grades of meat—Lice on poultry—Neufchatel cheese. Pp. 24, figs. 6.
451. Sterilizing tobacco-plant beds—Clover growing—Curing clover hay—The velvet bean—Draft horses—Care of mares and foals. P. 24, figs. 6.
457. Low-grade fertilizers—Fighting the boll weevil—Hastening maturity of cotton with fertilizers—Early spring lambs—Production of sanitary milk—Lacto: A frozen dairy product. Pp. 24, fig. 1.



A GRAIN HARVESTING SCENE.



A FIELD OF STRING BEANS.

465. Cost of available nitrogen; management of marsh soils; weeder harrow for dry farms; V-shaped corn-stalk cutter; storage for root crops; danger in feeding root crops; sanitary care of swine; individuality of the cow; hatching and raising turkeys.
469. Lawns; fertilizing asparagus; turnips for sheep; loss of lambs; cost of market milk; propagation of starters; the plastered silo.
479. Screening cabbage seed beds; Spraying apple orchards; New type of spray nozzle; Preparation of corn for hogs; Experiments in beef production; Preparation of choice hams; Factors affecting fat in cream.
486. The feeding of a grand champion steer; The utilization of dairy by-products as food.
499. Top-dressing pastures; Making hay; A fresh-air brooder; Roosting closet for poultry; Exhibition contests of dairy products; Blind staggers of horses; Abode as a building material; White and color washes.
504. Improvement of sandy soils; Utilization of roughage; Alfalfa and corn for lambs; Feeding alfalfa hay to swine; Cooperative herd testing; Cooperative cattle breeding; Losses due to low-grade cream; Disposing of waste dips; Care of farm machinery.
517. Promoting germination of seed; Cotton anthracnose; Asphaltum treatment for peach-tree borer; Raising and finishing beef calves; Open-shed feeding of steers; Four systems of dairy farming; Market eggs; Use of the sweet potato; Vinegar making from waste grapes; Lighting farm houses.

Yearbook Reprints.

329. The Relation of Forests to Stream Flow. Pp. 10. (1903.)
364. Some Benefits the Farmer May Derive from Game Protection. Pp. 12. (1904.)
388. Meadow Mice in Relation to Agriculture and Horticulture. Pp. 14, pls. 4, fig. 1. (1905.)
392. Illustration of the Influence of Experiment Station Work on Culture of Field Crops. Pp. 16, fig. 1. (1905.)
443. Does it Pay the Farmer to Protect Birds? Pp. 14, pls. 4. (1907.)
447. The value of Insect Parasitism to the American Farmer. Pp. 20, figs. 24. (1907.)
457. Hygienic Water Supplies for Farms. Pp. 10, pl. 1, figs. 4. (1907.)
497. A Directory for Farmers. Pp. 25. (Corrected to 1909.) (Agricultural statistics of crop and animal products are also published for each year and may be had on application to the Secretary of Agriculture.)

II. Vermont Experiment Station, Burlington, Vt.

SOILS AND SOIL MANAGEMENT.

Experiment Station.

The list of pages inclusive comprises bulletins of the Vermont College Experiment Station, obtainable on request of that station, Burlington, Vt. A large part of its publications are out of print. The subjoined list comprises any item which can be furnished. Soil Physiography, No. 143; Soil Classifications and Adaptions, No. 154; The Peat and Muck Deposits of Vermont, No. 165; Plant Food Combinations for Sundry Crops, Circular 7; The Principles of Land Drainage, No. 173; Irrigation, No. 182; Crop Rotation, No. 190; Concerning the 1916 Fertilizer Situation, Cir. 10.

COMMERCIAL FERTILIZERS.

The Experiment Station Bulletin for the Current Year.

MAPLE PRODUCTS.

Maple Sugar, No. 26; Buddy Sap, No. 151; The Micro-organisms of Maple Sap and Their Influence upon Maple Syrup, No. 167 (scientific).

SPRAYING.

Preparation and Use of Sprays, No. 113; Sundry Matters, No. 136; Plant Diseases, Potato Spraying, Nos. 142, 153, 159, 162, 179.

WEEDS.

The Viability of Weed Seeds in Fielding Stuffs, No. 138; The Grass and Clover Seed Trade in Vermont, No. 146; A Practicable Method of Killing Witchgrass, No. 149; Concerning the Hay Crop, No. 171.

INSECTS.

The Forest Caterpillar, No. 76.

PLANT DISEASES.

Nos. 142, 148, 153, 157, 159, 162, 168, 175, 179, 184, 185.

SEEDS.

The Grass and Clover Seed Trade in Vermont in 1907-08, No. 146; Agricultural seeds, No. 183, No. 192.

PLANT GROWTH.

The Role of Anesthetics and Other Agents in Plant Forcing, No. 150, 19th Report; Carnation Growing, No. 163.

FRUIT GROWING.

Winter Injury to Apple Trees, No. 119; Montreal Market Muskmelon Industry, No. 169; Farm Storage of Apples, No. 186.

FORESTRY.

Planting White Pine in Vermont, No. 120; Forest Planting in Vermont, No. 132; Preliminary Statement Concerning Forestry Problems in Vermont, No. 139; The Management of Vermont Forests with Especial Reference to White Pine, No. 156; The Damping Off of Coniferous Seedlings, No. 157; Hemlock in Vermont, No. 161; The Management of Second Growth Hard Wood Forests in Vermont, No. 176; The Tolerance of Forest Trees, Nos. 178, 181, 193; Forest Planting as an Investment in Vermont, No. 188; The Red Rot of Conifers, No. 191.

STOCK FEEDING.

Sundry Matters, No. 137; The Viability of Weed Seeds in Feeds, No. 138; The Composition and Nature of Commercial Feeding Stuffs, No. 144; Principles and Practice of Stock Feeding, No. 152; Concerning Feeding Standards, No. 158; Condimental Feeds, No. 164; Analyses of Feeding Stuffs, Nos. 144, 152, 158, 164, 171, 180, 189; Concerning the Hay Crop, No. 171; Vermont Grasses and Clovers, No. 94; The Effect of Frost on Silage Corn, 19th Report.

DAIRY HUSBANDRY.

Principles and Practice of Ice Cream Making, No. 155; The Effect of Age on the Yield and Quality of Milk, 19th Report; Methylene-blue, a Remedy for Infectious Abortion, No. 174; Concerning Feeding Practice, No. 180.

NATURE STUDY.

Vermont Grasses and Clover, No. 94; Vermont Shrubs and Woody Vines, No. 145; The Flora of Vermont, No. 187; The Trees of Vermont, No. 195.

INDEX

	Page
"A Few Fertility Facts"	8-11
Agricultural Advisers	15
Agricultural Education	94-104
Agricultural Publications	115-136
Agriculture, State Schools of	98-102
Alfalfa in Vermont	51-52
"Answer to the Question"	114-115
Apples	61-77
"Back to the East"	11
Barley	44-45
Beans (String)	79
Beechnuts	80
Beef Cattle	22-24, 113-114
Bee-Keeping	91-92
Blackberries	78
Buckwheat	46
Butternuts	80
Cherries	68, 78, 79
"Concerning Vermont Soils"	12-15
Corn	39-41
Corn (Sweet)	79
Cow Testing Associations	19
Creamery Inspection	18
Crop Yields and Comparisons	32-38
Currants	78, 80
Dairying	19-31, 122-123
Dairy Records for Vermont	26
Dairy Statistics for Vermont and Other States	27-31
Direct Marketing	104-108
Education	109
Experiment Station	95-96, 128-136
Extension Service	97-98
"Facts from the Census"	11-12
Ferns	109
Forestry	92-94, 119-120
Forests (State)	92

	Page
Goosecherries	78, 80
Granges	110
Hay	48-52
Health	108-109
Hickory Nuts	80
High Schools and Academies, Teaching of Agriculture in	102-103
Horses	82-86
Illinois Crop Yields and Values	38
Indiana Crop Yields and Values	38
Iowa and Vermont Compared	34-37
Junior High Schools	103-104
Lyndon, State School of Agriculture	98-101
Maple Sugar	52-60
Maple Trees Tapped and not Tapped; Maple Sugar and Syrup— Statistics by Towns	55-60
Marketing (Direct)	104-108
Middlebury College	98
Milk Shipments	21
Miscellaneous	108-110
Morgan, Justin	82
Nuts	80
Ohio Crop Yields and Values	37-38
Onions	79
Oregon Opinion of Vermont	74
Parcel Post	106-108
Peaches	79
Pears	79
Plums	79
Potatoes	46-48
Poultry	89-91
Randolph Center, State School of Agriculture	98-101
Raspherries	78, 80
Rye	45
Sheep	86-89
Small Fruits, Vegetables and Nuts	77-80
State Commissioner of Agriculture	18-19
State Schools of Agriculture	98-102

	Page
Summer Boarders	109
Summer Homes	109
Swine	89
Tobacco	52
University of Vermont	94-98
Vegetables	78-79
Vermont Crop Yields and Values	37
"Vermont as a Farming State"	58
Vermont Farming, Examples of	110-114
Water Power	109-110
Windham County, Agricultural Resources and Opportunities of	16-18

INDEX OF ILLUSTRATIONS

	Page
A Vermont Farm Home	Frontispiece
A Vermont Farm Barn	13
Ready for the Plow	13
Brown Swiss Cow, Champion 3-Year-Old of United States	25
Gathering Maple Sap	49
Boiling Maple Sap	49
A Vermont Apple Orchard in Bloom	65
A Vermont Raspberry Field	65
A Vermont Morgan Horse	81
The Ripened Corn	81
A Haying Scene	99
A Vermont Merino Sheep	99
A Clover Field	125
A Sprayed Potato Field	125
A Grain Harvesting Scene	133
A Field of String Beans	133